The Aviation Historian®

The modern journal of classic aeroplanes and the history of flying

A GOLDEN AGE?

IMPERIAL AIRWAYS: the 1930s

ISSUE 24

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Editor's Letter

HELLO AND A very warm welcome to *TAH24* — or perhaps that should be "*Ciao e un caloroso benvenuto*", as this issue has a distinct Italian flavour. It contains the most in-depth account yet published in English of Italy's wartime attempt to connect Rome with the capital of its Axis partner, Japan; and Amaru Tincopa's fascinating chronicle of the little-loved Italian Breda Ba.65 in Chilean service. Both articles benefited enormously from the help of Editorial Board member Gregory Alegi, whose efforts in this issue went far beyond the call of duty, and for whose sterling assistance I am extremely grateful.

This issue also sees the return of the John Stroud Archive (no relation!) after a brief intermission. We've always felt a particular affinity with John here at *TAH*, not least because our Managing Editor, Mick Oakey, works daily at the very desk at which John produced much of his life's work, and which was previously owned by *The Aeroplane's* Founding Editor, C.G. Grey. Mick explains:

"I had heard rumours that John had once owned 'CGG's' desk, so I asked him. He said he had got it from CGG a few years before the latter's death in 1953, and, what's more, he still owned it and used it in his tiny cottage in Scotland. I visited him in 2004; it must have been around then that John said he planned to leave the desk to me in his will. Sure enough, when he died in 2007, he had bequeathed it to me.

"I refurbished it with a good dose of beeswax polish, and now use it every day. Whenever I open one of its drawers I can still catch a whiff of John's pungent cigarette-smoke, and see the occasional ink-stain from CGG's pungent pen."

We're honoured to be able to trace a direct line from C.G. Grey through John Stroud to *TAH* — distinguished company indeed!

FRONT COVER ***The golden age of airline flying — or was it? This glamorous group beside a Short Scylla bound for Paris may think so, but was Imperial Airways' fleet fit for purpose? See pages 10–22.***

BACK COVER ***A two-Buccaneer formation over Scotland, led by Gp Capt Tom Eeles, who reveals in this issue what the type was like to fly.***

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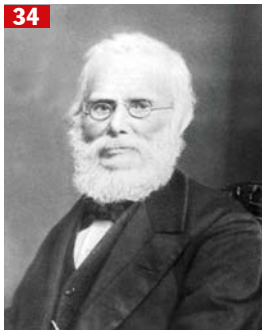


AIR CORRESPONDENCE

Letters to the Editor

Jaguar jeopardy

SIR — I have read the latest issue *(TAH23)* with great interest.

I attended the 25th Anniversary celebrations of the Nigerian Air Force (NAF), held at Kaduna in about April 1985. It was an experience never to be forgotten . . . but that is another story.

The reason I write is because a NAF two-seat Jaguar was lost at the time. I witnessed it taking off from the main base at Kaduna departing to a nearby airfield a few kilometres to the north-west. It became evident that the Jaguar had landed at the wrong airfield, a situation not discovered until the crew had shut down. The aircraft started up again to reposition to the correct one. The only trouble was that the aircraft was low on fuel and none was apparently available at Kaduna. It flew around at low level for a few moments and the pilots then declared they were lost. I was by now flying in a NAF Dornier Do 228, flown by a German crew, en route to the nearby airfield. I learned that, in the ensuing confusion, the Jaguar had run out of fuel and had crash-landed in open country. I do not think either pilot was badly hurt but a rescue helicopter was sent to the scene.

I offer this as there is no mention of a third Jaguar crash in your article *Jaguar International in Nigeria*.

Air Marshal Sir Ian Macfadyen *South Glos*

ATC strikes back

SIR — In your heading and intro for Phil Vabre's article *Premium Parking* in *TAH21*, you state "In late 1973 a pay dispute involving Sydney's air traffic controllers brought airline operations . . . to a grinding halt".

Now, in late 1973 I was three-quarters of the way through my initial training (checked out June 1974) and I don't recall an ATC strike in that period. Memory being what it is, I Googled it and could not find one. In the story, Phil makes it quite clear that "a strike by government communications *technicians*" (my emphasis) was behind the chaos.

Granted that we were a bolshie lot and did strike quite a bit back in those days, but if anything was learned from the 1981 American ATC strike and then the 1989 Australian pilots' dispute (note I don't use the word "strike" because they didn't go on strike — they resigned their jobs) it was actually that withdrawing labour had become a dangerous tactic and we began to use "work to rule", slowing the system down and refusing to work overtime when someone called in sick.

Anyway, I just thought I should draw to your attention that the article's intro is at the very least misleading.

Bob Livingstone *Samford, Queensland, Australia*

[Mea Culpa! Phil did not write the header. His response follows — Ed.]

Phil Vabre writes: Bob is correct in that you could only call it "ATC" in the most general and all-encompassing sense. As I said in the article, the chaps who were on strike were technicians, not what we (Bob and I being controllers ourselves) would term ATC. Organisationally, the technical personnel were not part of ATC but Airways Engineering. It's a bit like saying an airline's "crews" went on strike when it was really their engineers.

Even then the Department's technicians were, if I remember rightly, not the main strikers but were involved because trade-wide strikes were a common thing back then (in contrast to now when it is prohibited by industrial relations law).

Fillets and flow

SIR — The *Tunnel Vision* article in *TAH22* on wing root/fuselage interaction was fascinating and prompted a question, namely:

Once this was grasped, did anyone carry out any tests on a Hurricane (or still could today) to see what performance/handling enhancement might be gained from revised root fillets?

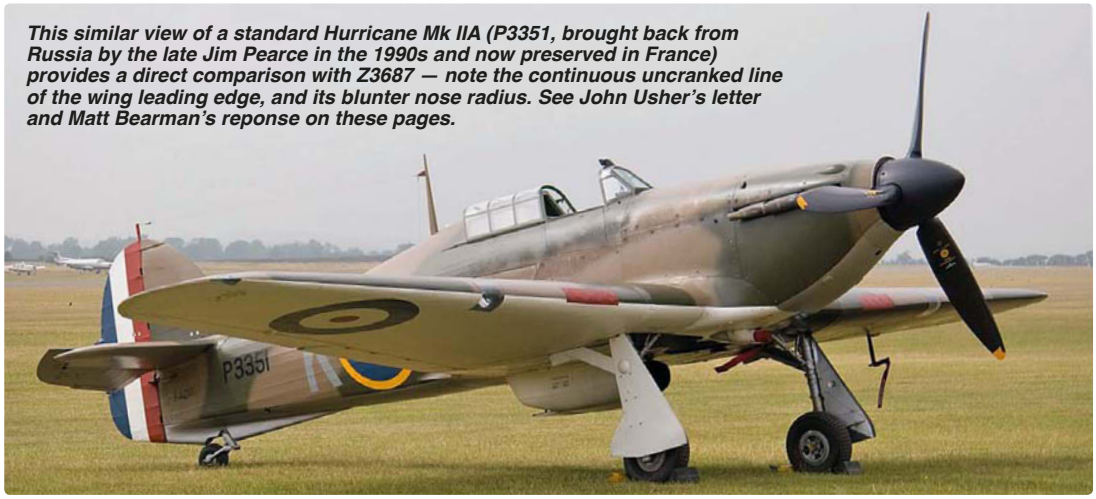
Perhaps *TAH* could offer a prize to the various Hurricane restorers for best drag reduction?

John Usher *Enfield, Middlesex*

Matt Bearman responds: I had a good look for Hurricane fillets, and found nothing — except for a subtle reduction in the thickness of the

TAH ARCHIVE

Hawker Hurricane IIA Z3687 with Armstrong Whitworth-built laminar-flow wings, at RAE Farnborough. Note the upward-cranked leading edges of both wings just outboard of the centre section, with fairings over the transition between conventional and laminar-flow aerofoil sections. The back of the original print bears the note, "Griffiths, Boundary Layer Research Hurricane, FBoro 11/9/48".



This similar view of a standard Hurricane Mk IIA (P3351, brought back from Russia by the late Jim Pearce in the 1990s and now preserved in France) provides a direct comparison with Z3687 — note the continuous uncranked line of the wing leading edge, and its blunter nose radius. See John Usher's letter and Matt Bearman's reponse on these pages.

wing fillet over the point of minimum pressure introduced at some point, with no records surviving — it is visible in photographs, though. It is a tiny change, probably the most that could be introduced by simply changing the curvature of a single pressed sheet, and it will be argued that I am imagining it, so I didn't mention it.

The Hawker Typhoon has a slightly better fairing over its 19-per-cent-thickness wing, but there is also a change in the wing/fuselage angle that reduces interference here.

Instead, Hawker did try a "laminar flow" wing on a Hurricane, with a supposedly lower-drag profile — I am lucky enough to have seen the Armstrong Whitworth drawings for this. They only changed the outboard sections; the roots remained the same. Unsurprisingly, it didn't do much for performance.

"Vibrating with noisy excitement"

SIR — Although the RAF had withdrawn from Heathrow in 1946 *(Heathrow: The Roaring Forties, TAH20),* they returned, briefly, to help the airport through the winter of 1947. The civilian Ground-Controlled Approach (GCA) crews were still being trained and the Instrument Landing System (ILS) was not yet reliable.

At the time I was stationed at Prestwick with the RAF's No 12 GCA unit. We were seldom needed there because of its good winter weather record, so we were "borrowed" and travelled south through the deep snows of January 1947.

We set up our stall on a small hardstanding at the upwind end of the runway in use. Usually this was at the eastern end of Runway 28, but when the wind changed a little caravan of trucks and trailers trundled round the airfield to its

new location. At some points there was an electricity supply but one of our trucks carried a large diesel generator which made the unit self-sufficient. The capabilities of GCA might have been cutting-edge for the time but they were, by later standards, rather primitive.

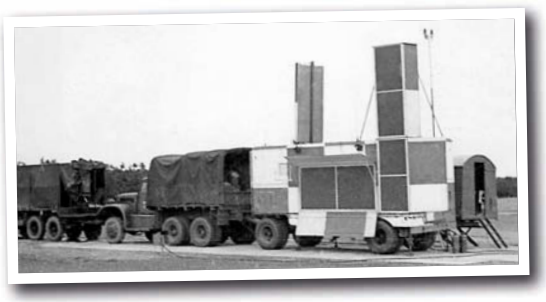
The rotating aerial (seen on the roof at the forward end in the image **BELOW RIGHT**) displayed all the air traffic up to a range of 30 miles. The screen display — with ample ground returns — was somewhat imprecise and there was no indication to tell the Controller which aeroplane he was talking to. So a Radio Direction Finding truck was parked nearby. Between bursts of crackling from the unshielded ignition systems of the passing builders' lorries, the D/F operators would confirm the bearing of the transmitting aeroplane. Then, to make sure, the Controller would ask the pilot to make a 90º turn "for identification". At last he could direct his chosen blip to a convenient point some ten miles from the runway.

Behind the four tall panels on the side of the radar truck were aerials transmitting narrow horizontal (azimuth) and vertical (elevation) beams, the latter angled to cover the 3º glide-slope. Both aerials constantly moved, up and down or side to side, to give adequate coverage of any deviation from the line of approach.

Early GCA needed a large crew. The elevation and azimuth returns were monitored by separate operators tracking the aircraft's blip with a cursor. The cursors' positions were repeated on a clearer non-radar display used by the Approach Controller to "talk down" the approaching aeroplane. Once it was established on the correct path he told the pilot not to acknowledge any further instructions and began a running commentary of any heading or rate-of-descent corrections needed. In the final stages, to ensure a clear and quickly-updated return, the aerials were switched to rapid movement and the whole truck vibrated with noisy excitement until the Controller said "A quarter of a mile from the runway — look ahead for the runway and land".

Despite the urgency of the request to bring the unit to Heathrow there was a marked lack of interest from the customers. Air Traffic regularly offered their new service and it was almost always declined — until one day of soggy fog with gently falling snow. A Lancastrian of British South American Airways was on its last leg home from Lisbon. The pilot refused GCA and insisted on his familiar SBA (Standard Beam Approach). Several attempts resulted in overshoots. He saw neither Runway 28 nor the succession of white Very lights being fired by the runway controller.

Changing to Runway 10 was equally unsuccessful. Even the pilots' checkpoint, the Peggy Bedford pub, was invisible. The time came for diversion to another airfield or GCA. Reluctantly he opted to be talked down. The controller's final instruction to "Look ahead for the runway" coincided conveniently with a break in the falling snow. The runway appeared in the windscreen and the relieved pilot landed. He was so overcome by the experience that he came round the airfield to inspect the GCA truck and shake the hands of his saviours. He told all his friends and colleagues and, as the word spread, requests for a GCA approach — even in fine weather — became the norm. The operators looked back on their rather more relaxed life at



TAH and GDPR Keep Calm and Carry On

WITH THE introduction of the General Data Protection Regulation (GDPR) on May 25, 2018, organisations and businesses across the UK and Europe have to follow even more stringent rules than before when using and looking after individuals' personal data such as contact details etc. *The Aviation Historian* is fully compliant with these new rules; for details, please see the Privacy Policy on our website, or request a copy of our GDPR compliance statement from *TAH*, PO Box 962, Horsham RH12 9PP.

LEFT ***When data was manual: WAAF, RAF and civilian clerks hard at work with typewriters, fountain-pens, box-files and piles of paper in Duxford's Station Orderly Room during the height of the Battle of Britain in 1940.***

This superb plan-view photograph of a Convair 990 clearly shows the large and distinctive — and apparently unnecessary — "Küchemann Carrots" anti-shock bodies on the wing trailing edges; see Giulio Valdonio's letter below.

TAH ARCHIVE

Prestwick with wistful nostalgia.

It didn't always go well. A Belgian pilot approaching in genuine fog drifted off line and was told to overshoot. He replied "It's OK. I got it" and landed — rolling along the peritrack past the tented terminal. Luckily, no other aeroplane or vehicle was in the way. (A less happy repeat of this occurred shortly after Heathrow's civilian GCA crew took over. A Viking diverted from fogbound Northolt missed the approach and crashed into a pile of drainpipes.)

Much of the above is taken from an article from the newsletter of the Aircraft Enthusiasts' Group. For more on the AEG and the rest of my GCA tale go to www.a-e-g.org.uk — Articles — and scroll down to *Early Days at Heathrow*.

Many thanks for the interest and enjoyment you give us with the excellent *TAH*.

Ernest G. Hart *Biggleswade, Bedfordshire*

A surfeit of carrots?

SIR — I would like to offer a minor correction to the otherwise excellent article by Sudiro Sumbodo on the Indonesian 990 Coronados, *The Convair 990 and Garuda Airways* in *TAH23*.

As a disillusioned Convair engineer once told me over a beer many years ago, the over-wing "Küchemann carrot" anti-shock bodies (also known as "speed canoes") were indeed successful, but extensive windtunnel tests proved that the same result could have been reached without them, thus avoiding their considerable weight and cost. However, the marketing department imposed their presence, as they had been widely advertised as the trademark of the 990's high-speed capabilities.

So they were kept — with the proviso that, owing to their rearward location on the wing, they could not be permitted to contain any fuel or other heavy masses which would cause centre-of-gravity problems. But again, an extended-range version had been marketed and sold, with additional fuel in the canoes, and the designers had to "take the necessary actions" to accommodate it. The "necessary actions" were the complete aeroelastic redesign of the wing, and a six-month delay in the programme.

Needless to say, the blame was apportioned to the design office . . .

Giulio Valdonio *Milan, Italy*

IMPERIAL AIRWAYS

THE 1930s: A CAUSE FOR CONCERN?

ABOVE *A classic Imperial Airways poster of the 1930s, in which elegant travellers arrive at their exotic destination aboard a gleaming flag-flying four-engined Short Scylla.*

MAIN IMAGE *The supremely graceful de Havilland D.H.91 Albatross was a shining symbol of British progress in airliner design during the 1930s — but the type suffered from structural problems and only seven were built. This example, G-AFDI* **Frobisher**, *awaits its next flight at Croydon in November 1938.*

TAH ARCHIVE

By 1930 aircraft design was advancing so rapidly that the long-range biplanes then being acquired by Imperial Airways for its Empire routes were already lumbering towards obsolescence. **RALPH PEGRAM** argues that the subsequent decade was far from a "golden age" for British civil aviation, and explores the Royal Aero Club Trust archive to reveal several previously unpublished 1930s Imperial design projects

THE 1930s are often referred to as "The Golden Age" of the British commercial operators, particularly Imperial Airways Ltd (IAL), a view the company itself strove to portray through its exquisite posters, in which glamorous couples are welcomed aboard immaculate silver aircraft to fly to exotic destinations through a cloudless sky while supping fine wines in luxurious cabins overlooking the pyramids, the tall masts of sailing ships and gently swaying palm trees. For a privileged few this may have been only a slight exaggeration of their experience, but for the majority of travellers it was often rather different, and by the middle of the decade the industry was becoming a cause for concern.

Major Robert Hobart Mayo, General Manager (Technical) at IAL, was a prominent member of the Royal Aero Club (RAeC) for many decades; a large number of his personal files and papers were donated to the organisation, and are now part of the RAeC Trust archives. Among this material are several outline specifications and tender documents for civil airliners, many for projects that were rejected and remained unbuilt, and some which do not appear to have been described in public before. Placed in context within the story of Imperial's aircraft fleet and services, they give an interesting insight into the unique procurement policy and operations of an increasingly troubled airline in the 1930s.

A SUITABLE CASE FOR TREATMENT?

The airline's problems were exposed for all to see in November 1937, when Richard Perkins MP launched a withering attack in Parliament on the Secretary of State for Air regarding the situation of British civil aviation, with particular emphasis on the operations of IAL. He was scathing in his comments regarding the antiquated nature of the aircraft IAL was operating on the European routes and appalled that British Airways, formed a few years earlier through the merger of three smaller

The 20-passenger Armstrong Whitworth Argosy trimotor was introduced into Imperial service in August 1926, and flew the first of the airline's "Silver Wing" lunch services to Paris the following May. It was later used on European and African services, but within a few years it had been overtaken in design terms by fast, sleek monoplanes designed and built in the USA.
TAH ARCHIVE

airlines, had been obliged to acquire American Lockheed 10 Electra aircraft, as no suitable alternatives of British design were available.

Britain's ability to compete for airliner orders across the Empire was equally compromised. Many European routes, Perkins pointed out, were not served by any British airline. He questioned the standard of instrumentation, operation of de-icing systems, accuracy of navigation equipment and facilities at airports, and condemned the conduct of IAL's management when dealing with its pilots and cabin staff. Perkins had been vocal in his support of the newly-formed British Airline Pilots Association, which IAL had refused to recognise. Perkins alleged that the airline had cut the pay for some pilots and laid off a few whom it considered instrumental in establishing the Association. Furthermore, he believed that the railways and booking agents were operating a form of cartel to restrict the free booking of air tickets. Turning his aim back on the Secretary of State, he pointed out that the findings of the Maybury Committee on the development of civil aviation, published in January 1937, had been all but ignored. In conclusion, Perkins called for a full public enquiry and "the head of the Secretary of State for Air on a charger". The full debate was recorded in Hansard.[1]

Perkins was supported in his demand by MPs Lt-Col John Moore-Brabazon (later Lord Brabazon of Tara), who seconded the motion, but opposed by Admiral Sir Murray Sueter (one of the founding fathers of the Royal Naval Air Service and the Navy's Superintendent of Aircraft Construction during the First World War), who felt that the situation was not as black as portrayed, and suggested the whole issue could be resolved "our old way", by having a quiet meeting with the Secretary or the Prime Minister. But matters had gone beyond this and the Secretary accepted that a departmental inquiry should be instigated.

The inquiry committee was headed by Lord Cadman and set to work on November 30, 1937. The committee solicited verbal and written input from a wide range of individuals, organisations and governmental departments associated with civil aviation. The whole process was thorough yet fast — something committees could learn from today — and Cadman presented his report to the government on February 8, 1938. The total cost was £5 19s 9d.

The report, although written in typically understated British style, was surprisingly harsh in its conclusions and upheld many of Perkins's accusations, stating that the situation was indeed unacceptable and that action was required as a matter of urgency if standards and British prestige were to be upheld.[2] Imperial's Chairman, Sir George Beharrell, was discreetly moved out and replaced by Sir John Reith; and, in November 1938, after some initial moves to reallocate routes, IAL and British Airways were in discussions and preparing to merge. Within the Air Ministry a new position was established for a Permanent Under-Secretary of State, assisted by a Director-General of Civil Aviation, to create a clear separation from the military side.

TRACING THE PROBLEM

So what had gone awry? Had IAL really overlooked the need for modern aircraft to serve the European routes from the mid-1930s onwards; and had it truly failed to note the revolution in airliner design heralded by types such as the

LEFT ***Presiding over the affairs of Imperial Airways since its creation in 1924 until his death in June 1937, Sir Eric Geddes was the longest-serving Chairman of the airline, although the position was always part-time, one of the problems raised by the Cadman Committee. Geddes was replaced by Sir George Beharrell, who was in turn replaced by Sir John Reith in June 1938.***

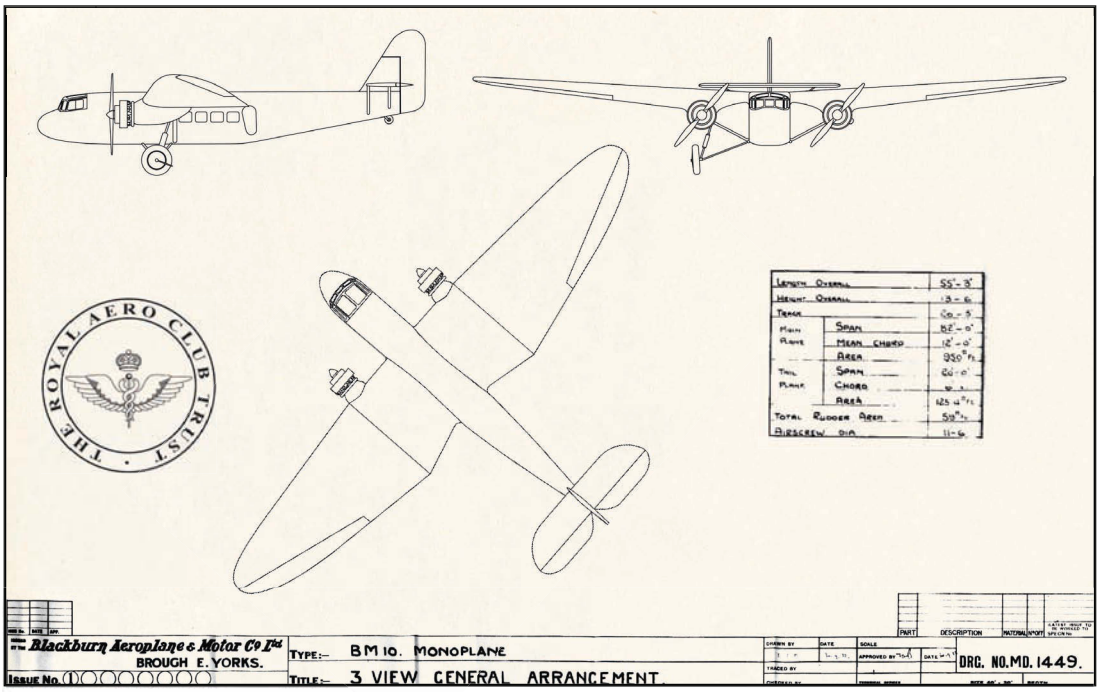
BELOW ***The fourth Armstrong Whitworth AW.XV Atalanta, G-ABTI, during a stop on its Nairobi—Cape Town route for Imperial in 1933. That year the type also began services on the Karachi—Singapore sector of the joint Imperial/Qantas route connecting the UK and Australia. In total eight Atalantas were built.***

Boeing 247 and Douglas DC-2? The answer to both questions appears to be a resounding "yes".

Formed in 1924 as the government's "chosen instrument" through the enforced merger of a number of small airlines, IAL was supported by generous government subsidies — as were its main continental rivals — and operated a mixed passenger and freight service, with much of the freight being mail. Pioneering survey flights in the late 1920s established a network of routes through the Mediterranean to the Persian Gulf, Indian sub-continent, Far East and Australia and downwards through Egypt and East Africa to the Cape. By the start of the 1930s these Empire routes were the primary focus for the airline, along which the company operated a diverse fleet, the main part comprising Short Calcutta flying-boats plus Armstrong Whitworth Argosy and de Havilland Hercules landplanes. While all were biplanes and not noted for passenger comfort they were, nevertheless, of equal or higher standard than those operated by most of IAL's rivals. The onset of the Great Depression had led to a major impact on revenue, and many older aircraft types had been withdrawn before the turn of the decade. Passenger numbers held firm, however, and IAL weathered the storm and slowly began to expand its fleet.

Imperial decided that, as a matter of policy, only multi-engined aircraft would henceforth be operated, and that for passenger services four engines would be stipulated, with a little flexibility for the smallest class of "feederliner" or charter aircraft. The next generation of large aircraft, ordered in the closing years of the 1920s, adhered to this policy. First to enter service, in mid-1931, were the large Handley Page H.P.42 landplane and Short Kent flying-boat, with its landplane derivative the Scylla following a little later. While these represented an improvement over their predecessors in terms of passenger and crew comfort, they remained slow, conservative biplane designs — a reflection of the undemanding specifications issued by the airline.

In 1930, however, IAL issued its first outline specification for a more advanced airliner. This was to be a four-engined aircraft to serve on the Africa routes, and thus had to contend with poorly prepared airfields, often at altitude and in high temperatures. Armstrong Whitworth tendered the AW.XV Atalanta, a neat high-wing ply-skinned monoplane with a fixed, but low-drag, undercarriage. Imperial ordered eight, configured to carry either nine or 11 passengers. The Atalanta entered service in 1932, and, while a very successful and robust aircraft, it was often found to be rather too small to handle the demand



AIRCRAFT ILLUSTRATION BY RALPH PEGRAM

ABOVE ***Based on original design documents held in the Royal Aero Club Trust archive, this general arrangement drawing of the unbuilt Blackburn C.A.15D shows its Stieger Monospar wing of 82ft (25m) span and its retractable undercarriage — both features that distinguished it from the built and flown C.A.15C monoplane and biplanes.***

on its routes, a situation that does not appear to have been noted when IAL wrote later specifications. With the Atalanta order in place, IAL was largely content with the spread of aircraft types within its Empire fleet, and chose to spend several years mulling over the options for the next generation of aircraft to serve on these routes.

THE FEEDERLINERS

Meanwhile, smaller airliner types were seen as having low priority but were not totally neglected. British manufacturers already offered a broad range of aircraft capable of carrying up to 12 passengers. Types such as the 12-seat Vickers Viastra, available in single-, twin- and three-engined form, Avro's monoplane family built under licence from Fokker and the de Havilland D.H.84 Dragon were acquired in small numbers by other airlines but raised little interest at IAL.

From the RAeC Trust archives and other sources we can see that new designs from an industry struggling in the Depression were also tendered on a speculative basis but they, too, fell on deaf ears. Aircraft like Supermarine's Type 181 single-engined amphibian, a Walrus-like six-seat aircraft tendered in 1930,[3] Gloster's twin-engined Amphibian family of 1930 and Charter Monoplanes of 1931,[4] and Blackburn's revised C.A.15D with a Stieger Monospar wing and retractable undercarriage in 1932, are typical offerings of this period.

In early 1933 IAL issued a requirement for a twin-engined six-seater to function as a feeder-liner or charter aircraft. Boulton Paul tendered the P.71A twin-engined biplane, derived from its P.64 Mailplane, an aircraft built to Air Ministry Specification 21/28 and which was just commencing flight testing. In response to the same requirement Avro tendered the more advanced Type 652, a low-wing cantilever monoplane with retractable undercarriage. Imperial ordered just two examples of each. Boulton Paul's P.64 Mailplane was plagued by directional control issues and the P.71A, although sporting revised tail surfaces, evaluated in the RAE windtunnel, proved to be little better. Avro's 652, however, was a versatile and rugged aircraft that IAL chose to use mainly for crew training. The military version, the Anson, sold in large numbers.

This, surprisingly, appears to have been the extent of the company's interest in new small and medium-sized airliners in the first half of the decade as it focused tightly on expanding the Empire routes and the requirements to run the government's Empire Air Mail Scheme, to the detriment of internal, European and intermediate-distance routes. Imperial stated quite openly that the Paris and Cologne routes served as useful "shop windows" for the airline, while it was quite prepared to leave other routes to its small, underfunded and mainly unsubsidised British competitors and the continental airlines. The government appeared equally comfortable with this policy.

While IAL continued to ponder its future requirements, technology was advancing apace

With Handley Page H.P.42* Heracles *nosing into the picture from the right, Boulton Paul P.71A G-ACOX is prepared for a flight at Croydon. Only two examples of the P.71A feederliner were completed and both were delivered to Imperial in February 1935. Both had been lost in accidents by the end of 1936.
PHILIP JARRETT COLLECTION

PHILIP JARRETT COLLECTION

RIGHT ***The interior of a P.71A with a seven-passenger layout; the type could be configured to accommodate up to 14 passengers in a high-density layout.***

and a number of innovative airliner types were on the drawing board or under development, notably in the USA, where the government had taken steps to encourage the development of fast all-metal aircraft.

THE SHAPE OF THINGS TO COME

The arrival of the Boeing 247 and DC-2, in 1933 and 1934 respectively, served as a wake-up call to airlines and aircraft manufacturers alike. Both types were all-metal twin-engined low-wing cantilever monoplanes with low-drag engine cowlings, a retractable undercarriage and variable-pitch propellers, all of which combined to give them top speeds of more than 200 m.p.h. (320km/h). Their cabins held ten and 14 passengers respectively and larger types were under development. The first DC-2 acquired by KLM and a Boeing 247 were entered in the 1934 MacRobertson race from Mildenhall, England, to Melbourne, Australia, in which their performance against the eventual winner, de Havilland D.H.88 Comet G-ACSS, a specialised racing design, was highly commendable.

Imperial stated that it had found that it took around three-and-a-half years to progress from the issue of an outline specification to a new aircraft entering service, comprising a combination of design, development and construction time and the need to iron out teething troubles for a new type. The useful life of an aircraft was expected to be four or five years. While IAL was averse to ordering a new type in quantity before first evaluating a prototype, the inherent development delays meant it was unable to avoid doing so. Procrastination over the issue of specifications only served to exacerbate this problem.

For IAL the location of the major destination towns and cities in the British colonial and protectorate territories on coasts, rivers and lakes strongly influenced its decision to specify flying-boats to form the backbone of the new Empire fleet. So in late 1934, after much discussion and deliberation, an outline specification was issued for a four-engined type to carry 24 passengers over 500 miles (800km) at a cruising speed in excess of 130 m.p.h. (210km/h). Short Brothers tendered the all-metal cantilever monoplane S.23, which exceeded these requirements by a wide margin, and 28 were ordered straight off the drawing board as the "C" or Empire Class. In terms of technical advance the S.23 was very much the equal of the latest American landplanes.

A comparable specification for a landplane equivalent to the Empire flying-boats was issued at the same time and resulted in an order for 14 Armstrong Whitworth Ensigns, split between

TAH ARCHIVE

ABOVE ***Almost twice the size of its Atalanta predecessor, the Armstrong Whitworth AW.27 Ensign made ts first flight on January 24, 1938. Capable of accommodating up to 27 passengers, the type incorporated a retractable undercarriage and was certainly a step in the right direction for Imperial in terms of modernising its equipment.***

Empire and European types, the latter capable of carrying 40 passengers. The Ensign was less advanced than Short's flying-boat and the new American airliners, as its thick-section cantilever monoplane high-set wing was partly fabric-covered. Unfortunately the type would not be introduced into service until 1938, delayed as priority was given to the development and production of the company's Whitley bomber.

In mid-1935 IAL issued an outline specification for a second passenger-carrying flying-boat capable of tackling the transatlantic route. In the USA Juan Trippe, President of Pan American Airways, had been pressing for the reciprocal agreements necessary to run such a service and had flying-boat "Clippers" under construction by American manufacturers Sikorsky and Martin.

Responses to IAL's specification came from Short Bros, which tendered the S.26, a scaled-up derivative of the S.23/S.30 (strengthened variant), and from Supermarine, which proposed the Type 306, a large flying-boat to be powered by four Rolls-Royce Merlins.[3] Two routes were required for the prospective service; a direct route from Ireland to Newfoundland, along which the aircraft could operate only in the summer months owing to icing problems in Newfoundland, and a longer southerly route that required transiting to the UK via the Bahamas, Azores and Lisbon in Portugal. Because the base at Horta in the Azores was not well sheltered, it was less than ideal for flying-boat operations and Supermarine proposed using a ship or barge-mounted catapult to assist take-off for its Type 306.

The Air Ministry was in mid-bloom of a short-lived flirtation with the idea of a form of catapult to launch military bombers and civil mail-carrying aircraft, much as Lufthansa used ship-mounted catapults for its transatlantic mail service. However, there were serious doubts about whether passengers would be prepared to accept the system, even with acceleration restricted to only a little more than 1g, and the idea failed to gain support. Consequently IAL took the logical decision to award the contract to Short Bros, which had proven expertise and would provide an aircraft with much in common with the airline's fleet of Empire flying-boats.

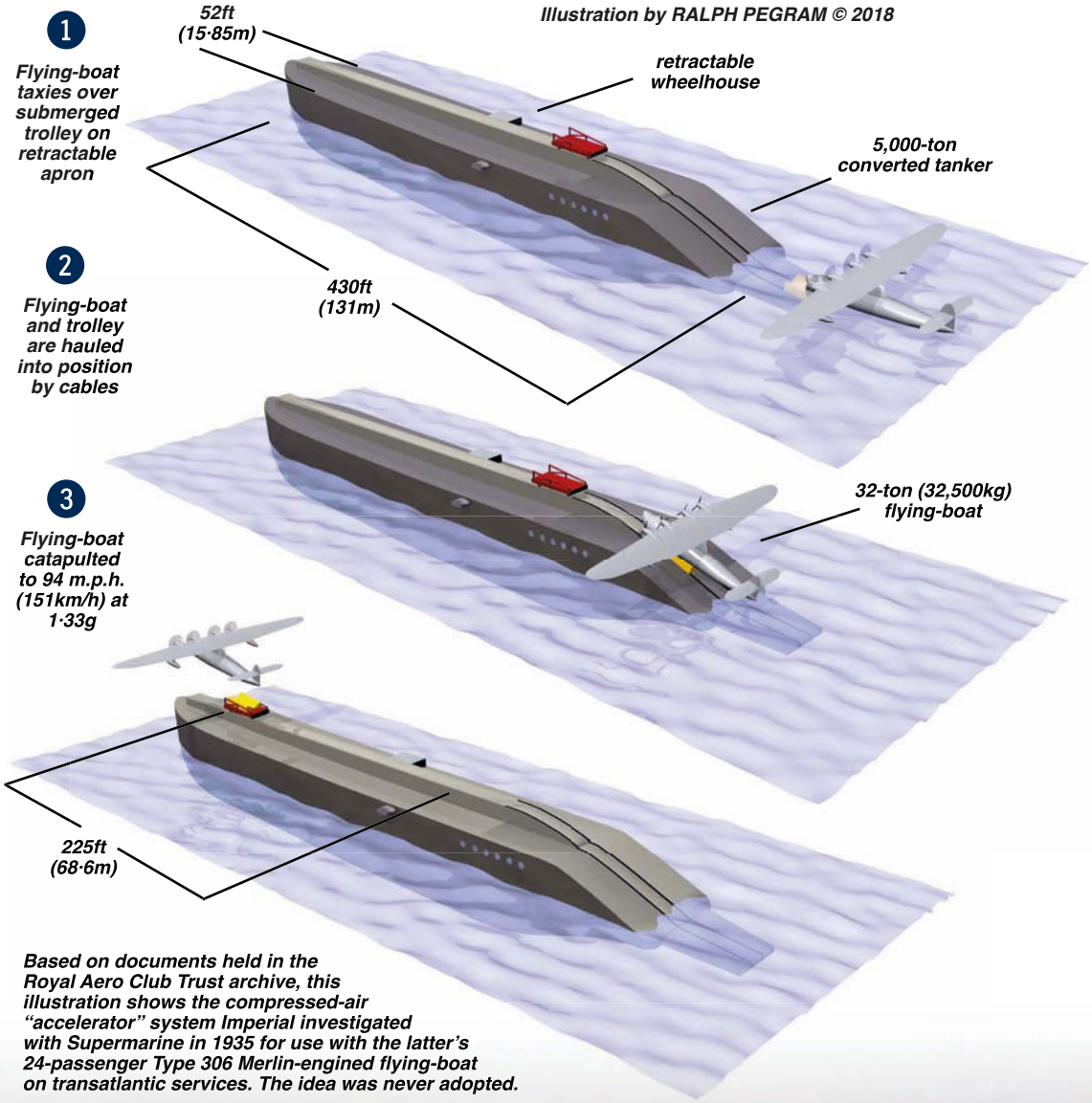
AN OCEAN-GOING BIRD

Rather belatedly, given the growing competition from overseas, an IAL draft specification was now under consideration for a four-engined 12-passenger high-performance airliner. The initial requirement called for a cruising speed of 230 m.p.h. (370km/h) and range of 500 miles (800km). Imperial considered two engine types for it; either the Napier Dagger III or Bristol Pegasus X. It seems unlikely that this requirement was ever finalised and issued, but some elements of the idea may be found in Air Ministry Specification 36/35, written around de Havilland's elegant D.H.91 Albatross. A high-speed long-range low-wing monoplane mail carrier or 22-seat passenger airliner of exceptionally clean design and with a fully retractable undercarriage, the Albatross had a planned range of up to 2,500 miles (4,000km) at a cruising speed of 210 m.p.h. (335km/h), making it capable of flying the Atlantic.

Although IAL showed interest in the project, it required Air Ministry funding to proceed. The design was somewhat experimental, employing untried moulded balsa-and-plywood stressed-skin monocoque construction and new 12-cylinder de Havilland Gipsy Twelve engines with innovative low-drag reverse-flow air-cooling. Two prototypes were ordered.

In December 1935 Douglas flew its Douglas Sleeper Transport (DST), a 14-berth sleeper airliner in the form of an enlarged DC-2. In day-travel configuration this became the 21-seat DC-3, with a range of up to 1,500 miles (2,400km)

THE SUPERMARINE TYPE 306 & SEA CATAPULT



Based on documents held in the Royal Aero Club Trust archive, this illustration shows the compressed-air "accelerator" system Imperial investigated with Supermarine in 1935 for use with the latter's 24-passenger Type 306 Merlin-engined flying-boat on transatlantic services. The idea was never adopted.

BELOW *Short S.23 C-Class Empire Flying Boat G-ADUW* **Castor** *flies the flag for Imperial after its introduction into service in January 1937. The following month Imperial's C-Class 'boats began regular services on the Empire routes from Hythe, the S.23s representing the pinnacle of intercontinental flight at the time.* TAH ARCHIVE

ALPHA ARCHIVE x 2

ABOVE ***By the mid-1930s the level of comfort in American monoplane designs like the Douglas Sleeper Transport, forerunner of the world-beating DC-3, was light-years ahead of the spartan accommodation of Imperial's land-planes. These two DST interior photographs show how the day configuration converted into overnight bedding.***

and a cruising speed of just under 200 m.p.h. (320km/h). In Europe KLM introduced the DC-3 on its routes in 1936. In stark contrast, earlier that year IAL had ordered a small number of D.H.86 Express four-engined ten-passenger biplanes, an aircraft originally designed for the final leg of the IAL/Qantas route from London to Sydney. Although the D.H.86 was a conservative design derived from the successful D.H.84 Dragon, it had several design flaws owing to its rushed development and it proved troublesome.[5]

By the end of 1935 IAL had 42 aircraft of 12 different types in service. The Short S.23 flying-boats were under construction and were expected to enter the fleet the following year, while Armstrong Whitworth's Ensign was much delayed and work had barely started.

THE NEW WAY

By mid-1936 Imperial was preoccupied with the complex preparations necessary for the arrival of the Empire flying-boats. These represented a huge leap forward in terms of performance, and the large number entering service required new crews to be employed and trained, and rigorous maintenance and servicing schedules to be devised.[6] The S.23 had an enclosed cockpit for the pilots, positioned considerably higher above the water than on any previous type; in addition, the engines were fitted with variable-pitch propellers and the cantilever monoplane wings incorporated a sophisticated flap system — two innovations with which the crews were unfamiliar. The aircraft were heavier and landed faster than the old biplane types, and handling them was going to require both flight and service crews to gain expertise rapidly.

Towards the end of 1936 IAL issued a new outline specification for an "Intermediate Class four-engined Land Type Aircraft" to operate on the European and Empire routes. This was to carry 16 passengers at a cruising speed of 200 m.p.h. with a range of 500 miles (800km). Short tendered the all-metal high-wing S.28 monoplane, which drew heavily on its design work for the S.23, particularly the wings. With a span of 95ft (29m) and length of 74ft (23m), it was slightly larger than a DC-3, but with a passenger load comparable to the smaller DC-2. A copy of the tender document for this aircraft is in the RAeC Trust archive, but unfortunately the accompanying general arrangement drawings are missing (perhaps a *TAH* reader may be able to locate a copy — Drawing No C.R.2365).

The Douglas DC-2 represented the state of the art when it was introduced into European service by Dutch national airline KLM in the summer of 1934. The sleek 14-passenger monoplane had made its first flight on May 11 that year, the same month that Imperial put the Short Scylla biplane into service on its European routes.

MIKE HOOKS

ABOVE ***An impression of the Airspeed AS.35, based on the manufacturer's Drawing No 3501003 of 1934 for a "Small Four Engine Airliner", held within the Royal Aero Club Trust archive.The twin-tail high-wing monoplane was to be powered by a quartet of 205 h.p. de Havilland Gipsy Six II engines. Artwork by RALPH PEGRAM © 2018***

The Achilles' heel of this IAL specification, however, was the requirement for the aircraft to be powered by four engines, as Short believed there was a distinct shortage of suitable engines of the appropriate power for an aircraft of this size. They therefore proposed two options: either the 510 h.p. Armstrong Siddeley Terrier or 695 h.p. Pobjoy Amazon (the latter probably selected as Pobjoy was by this time part-owned by Short). These were curious choices, as both engines existed only on the drawing board at that time and even in the most optimistic case were several years from production. As it turned out, neither engine was ever built.

There are no documents in the RAeC Trust archive to suggest that other manufacturers were invited to tender to this specification, and no contract was awarded to Short Bros. Once again IAL had fumbled an opportunity to modernise its fleet, its dogged insistence on four engines proving to be a stumbling block.

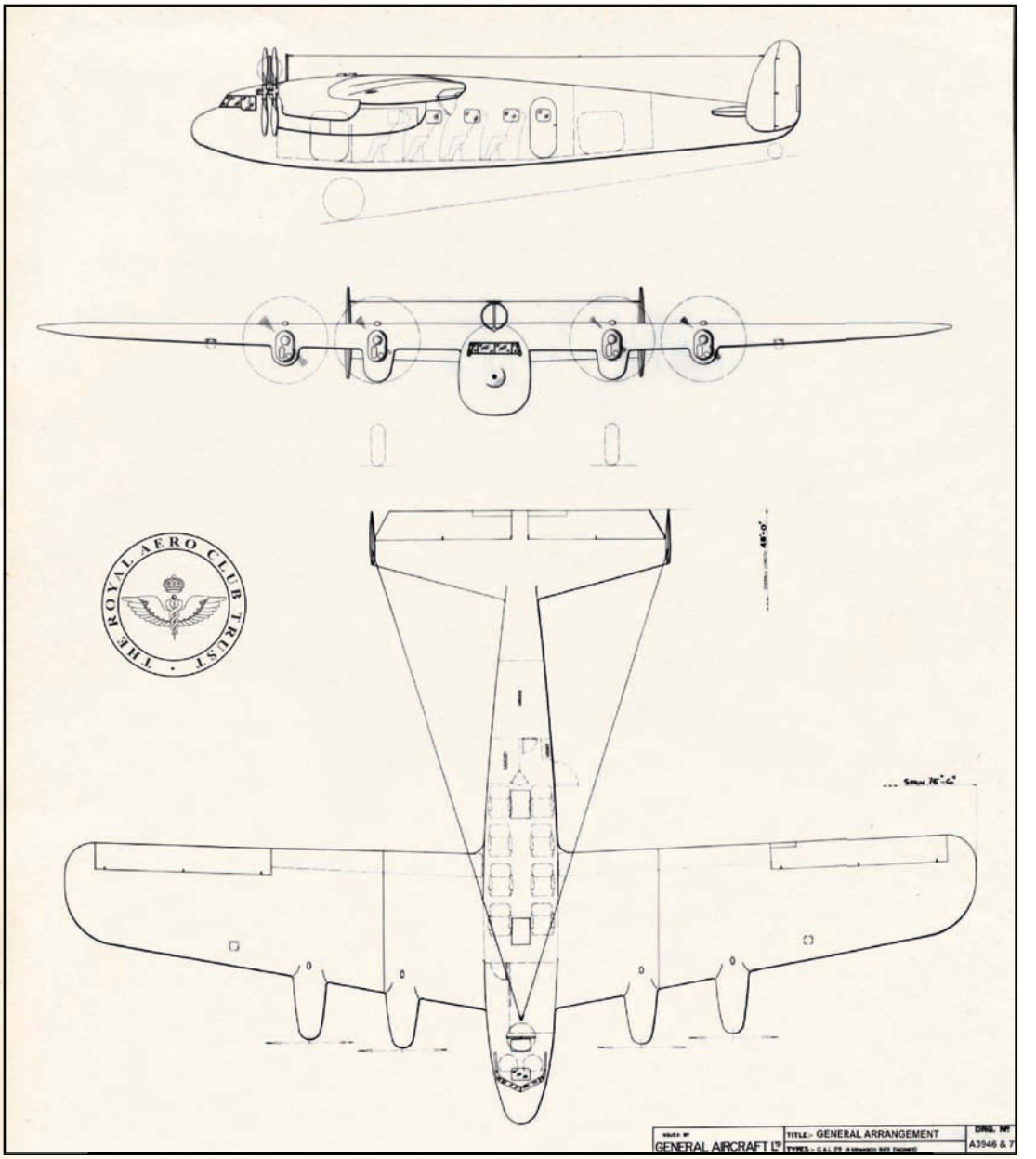
EXPANSION . . . AND CONTRACTION

In early 1937 the company issued one further outline specification, for a "Small Four-engined Land Type Aeroplane" to carry eight passengers over 500 miles. Conceptually this could be considered as a replacement for the D.H.86; but, with its lower capacity, it is hard to envisage why such a small aircraft would have been needed.

By now IAL was all too aware that the RAF's expansion plans, which had commenced in mid-1934, were responsible not only for serious delays in civil aircraft projects such as the Ensign, but also for a notable decline in interest within much of the aircraft industry to respond to IAL's requests. After all, with contracts for the military requiring potential production runs of several hundred aircraft, there was little attraction in diverting scarce resources, skilled personnel, workshop space and machinery to a civil project involving production that probably would not reach double figures. As a consequence IAL issued this latest outline specification to two of the newer, smaller aircraft companies that were not, as yet, involved in large military contracts — Airspeed and General Aircraft Ltd (GAL).

Both companies had responded by the end of February 1937 with broadly similar designs. The AS.35 and GAL.29 were both all-metal high-wing cantilever monoplanes with retractable undercarriages, powered by four six-cylinder in-line air-cooled engines. Airspeed elected to fit the de Havilland Gipsy Six powerplant, while GAL preferred the American Menasco Buccaneer, for which Phillips & Powis, then building F.G. Miles-designed aircraft, held the UK licence, as the power-to-weight ratio was superior; the Gipsy Six was offered as an alternative. Both aircraft were expected to have a top speed of around 170 m.p.h (274km/h). It is noteworthy that while both companies were well regarded for their light, clean, cantilever monoplane aircraft, and had developed and manufactured retractable undercarriage systems, neither had experience with all-metal stressed-skin designs or construction.

Airspeed, however, had entered into an agreement with Fokker in 1935 to licence-build several of the latter's designs and to acquire a subcontract licence to manufacture the DC-2 for sales within Britain and the Empire. In preparation Airspeed employed new design staff with experience of metal stressed-skin techniques, notably Frank Radcliffe, formerly at Gloster, although in the end the deal came to nothing. Hessel Tiltman, director and chief designer at Airspeed, cautioned that the IAL specification resulted in an aircraft which was very weight-sensitive; a small increase above the estimated tare weight "would reduce the payload of this aircraft to a point which would appear to us to render the aircraft so uneconomical as to make it of little interest to an operator".



The GAL.29 (**ABOVE**) was the first of a number of ambitious airliner designs the company produced over the next couple of years as it sought to expand. Like Airspeed, the company was engaged in acquiring expertise and design staff familiar with metal construction. Its proposed design was slightly larger and about 12 per cent heavier than the AS.35. The company had previously submitted a speculative tender for a ten-seat version of the GAL.29, from which its revised aircraft was derived; the larger, earlier design featured a different wing with bracing struts and Armstrong Siddeley Cheetah engines. As an alternative GAL also offered a modified version of its Monospar-winged ST.18 Croydon, which had first flown in 1935, and which was fitted with Bristol Mercury IX engines.

Neither company was ultimately awarded a contract, which prompts the question as to why the Specification was raised in the first place.

BACK TO THE FUTURE

This, then, was the situation when Perkins launched his attack in Parliament. IAL's fleet was, with the exception of the Empire flying-boats, elderly and increasingly obsolete, and the available information certainly suggests that no serious efforts had been made to procure

ABOVE ***General Aircraft Ltd's GAL.29, designed to the same Imperial Specification as Airspeed's AS.35, was a slightly scaled-down development of a ten-passenger version, but neither was ever built. Quite why the Specification for this largely redundant type was issued at all remains unknown. Artwork by RALPH PEGRAM © 2018***

replacements. Modern mid-size medium-range aircraft of the type pioneered by the DC-2, DC-3 and Lockheed 10 had been entirely absent from IAL's plans, leaving it in a weak position to compete over many European routes in the coming years, and British aircraft manufacturers without aircraft to offer overseas customers.

Cadman was scathing in his analysis, pointing out that there had been no government policy either to support or encourage the development of new routes, and hence no policy to encourage the manufacture of appropriate new airliner types, least of all with financial assistance. Furthermore, Cadman was profoundly dissatisfied with the relationship between the Air Ministry and IAL. He found the management of the airline to be defective in its dealings with the Ministry, to have been intolerant of suggestions and to have taken an unyielding attitude in negotiations.

With regard to the aircraft industry, the report acknowledged the obvious; that Britain had lost the initiative in civil aircraft construction, owing largely to the pursuit of more lucrative military contracts. This meant that British manufacturers "had shown little disposition to embark on the costly venture of producing modern civil machines in a speculative attempt to re-enter the lists". Although he noted that this was a vicious circle, in which lack of demand was mainly due to a paucity of products to stimulate such demand, Cadman considered the manufacturers' attitude to be short-sighted, as the long-term profitability of the industry would ultimately depend more on civil contracts than on military.

His conclusions, therefore, spread the blame for the current situation across government, industry and airline, with IAL the most at fault. All in all, this was no "Golden Age".

IMMEDIATE ACTION

The government took immediate steps to remedy the situation regarding the critical need to develop new airliners. In mid-1938 it issued two new Specifications, 14/38 and 15/38, for four-engined monoplane airliners for operation on long and short/medium routes respectively, with prototypes to be delivered in 1940. To 15/38 Vickers and Armstrong Whitworth declined to respond and Bristol withdrew early in the process, all because of priority given to military projects, thereby confirming Cadman's conclusions.

After preliminary negotiations, tenders were received from Fairey, GAL and Folland Aircraft, all submitting low-wing twin-tailed aircraft with tricycle undercarriages. Despite being much admired on technical merit, on paper at least, GAL was eliminated as the Air Ministry was not convinced that the company had sufficient design expertise, and its factory was heavily committed to subcontract work on the Spitfire, for which it was in a "blame game" argument with Supermarine over delays. Folland was also eliminated; despite having impeccable design credentials it had not as yet built any aircraft and was engaged in a wide variety of subcontract work for Short, Bristol, Vickers and Supermarine.

After negotiations on price and cost of tooling, a contract for prototypes was awarded to Fairey for the FC.1.[7] Apparently an invitation to tender to 14/38 was sent to Short Bros alone, based, presumably, on its proven expertise with four-engined civil aircraft and transatlantic operations. Although its design, the S.32 *[to be covered by the author in a forthcoming article — Ed.]*, drew heavily on the structure of the large "G-Class" flying-boat and Stirling bomber, Short could be considered a potentially problematic choice: its works was already under serious pressure building the remaining Empire flying-boats, the three big transatlantic flying-boats, plus large numbers of military Sunderland reconnaissance flying-boats and Stirlings. Fairey, however, appears to have had the capacity to handle its contract.

By now Imperial had its S.23 and upgraded long-range S.30 Empire flying-boats active along all the Empire routes and they were giving good

TAH ARCHIVE

ABOVE ***With its slender, elegantly curving fuselage, shapely wings and extremely closely cowled streamlined Gipsy Twelve engines, the de Havilland D.H.91 Albatross was the very model of modernity when it entered Imperial Airways service in late 1938. All seven examples were transferred to the newly-minted BOAC in September 1940.***

service, although the company had failed to establish a dedicated flying-boat base at Portsmouth as originally planned, and passengers had to be embarked via launches, which was less than ideal. The same situation was true at most stations on the Empire routes. The flying-boats had also made experimental crossings of the North Atlantic, to assess the requirements of operating on these routes, and inflight refuelling operations had been trialled, all of which were successful. Imperial had increased its S.30 order by a further 11 aircraft in late 1937. There had, however, been a spate of S.23 accidents, mainly during take-off and alighting, that exposed weaknesses in the flying-boats' planing surfaces, which had to be strengthened, as well as in the corrosion resistance of the Alclad plating and, above all, the inherent problem of operating an advanced aircraft in restricted waterways far from service and repair facilities.

The first D.H.91 Albatross had flown in May 1937 and early tests identified weaknesses in the undercarriage and poor directional control that required rectification. More serious, however, was the failure of the monocoque fuselage of the second prototype during landing on a test flight while carrying a high load. Redesign of the door apertures, which had weakened the integrity of the monocoque, resolved the problem and IAL ordered five passenger aircraft. The first entered service in October 1938, flying on European routes, but passengers found the flexing of the fuselage uncomfortable. The Ensign finally flew in January 1938 and proved to be underpowered, so new engines had to be fitted mid-year, the type also entering service in October 1938. Finally, the first of the three large S.26 "G-Class" flying-boats for the Atlantic service flew in July 1939.

Although a long way from being fully resolved, IAL's problems were being addressed slowly when the process was curtailed abruptly by the outbreak of war, when many routes were disrupted and some aircraft had to be redeployed to support the military. The contracts for new airliners with Short and Fairey were terminated in short order and the development of all civil aircraft was put on hold for several years.

It was not until the Brabazon Committee was formed in late 1942 that the issue of how Britain's airlines would operate in a post-war world, and what aircraft types they would require, was addressed again. Brabazon's conclusions envisaged an airliner fleet very different from that flown in the years of the immediate pre-war period; the merits of the types that were built as a result, and indeed those that were not, have been a rich source of debate ever since.

ACKNOWLEDGMENTS *The general arrangement drawings presented here have been assembled from originals in company tender documents held in the Royal Aero Club Trust Archive*

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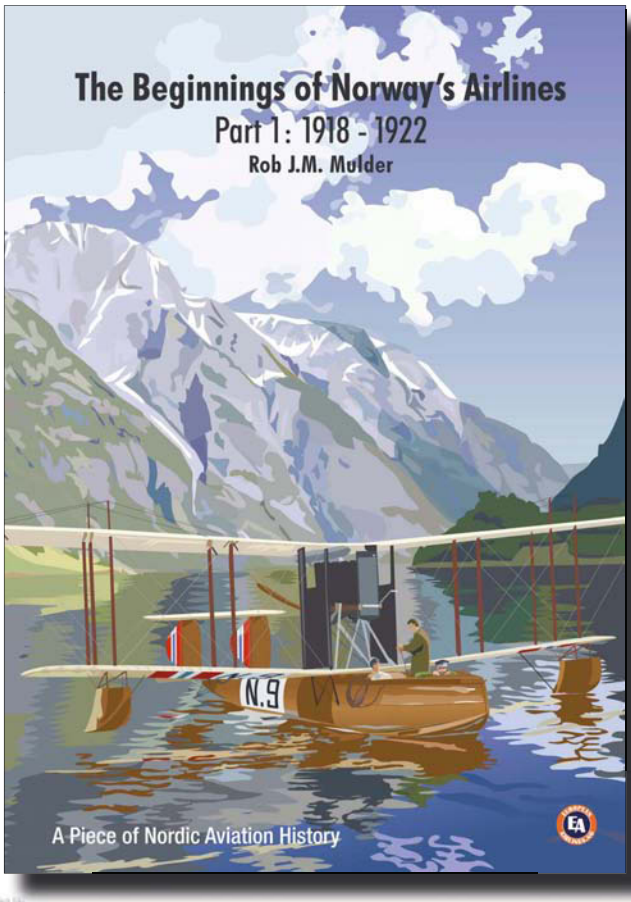
1918–2018: 100 YEARS OF NORWEGIAN COMMERCIAL AVIATION
THE BEGINNINGS OF NORWAY'S AIRLINES

July 10, 1918, marks the centenary of the establishment of Norway's first airline, Det Norske Luftfartrederi (DNL). Operations did not start until 1920, however, when the new company won a bid to operate a service from Stavanger to Bergen via Haugesund. Other companies were not far behind, no fewer than six airlines inaugurating services in Norway between 1918 and 1922.

This first volume in European Airlines' new series on Norway's airlines takes an in-depth look at the companies formed during 1918–22, including the aircraft imported and the people involved, using numerous photographs, many of which are published here for the first time. The second part, available soon, covers 1923–34.



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STRATOJETS IN BLIGHTY

STRATEGIC AIR COMMAND'S FIRST UK B-47 DEPLOYMENTS

Some 65 years ago the UK experienced its first encounter with the futuristic Boeing B-47 Stratojet, when Strategic Air Command's 306th Bombardment Wing became the first of three B-47 Wings to deploy to "Blighty" during 1953. The co-authors of a new definitive book on the type, **C. MIKE HABERMEHL & ROBERT S. HOPKINS III**, detail the introduction of the six-engined nuclear bomber to British skies

BOEING BW90188

ABOVE *Three B-47 pilots of the 368th BS walk in at Fairford after a sortie in B-47B 51-2277 during the 306th BW's UK visit in the summer of 1953, Strategic Air Command's first operational deployment of the type to Europe.*

MAIN IMAGE *A 306th BW B-47B at Fairford on a rare sunny day during the Wing's 1953 UK deployment. Fairford opened as an RAF base in early 1944, but in 1950 was placed under the control of the USAF's Seventh Air Division, which set about lengthening the runway and enlarging the airfield.*

HAROLD SIEGFRIED VIA AUTHORS

BY 1952 THE USAF's Strategic Air Command (SAC) had a problem when it came to international air power projection. The lack of range of its early Boeing B-47 Stratojets was creating a significant operational shortfall — the bombers simply could not reach targets in the Soviet Union when launched from bases in the USA without at least one aerial refuelling. Even then the type lacked the range to reach post-strike bases for reconstitution. Problems with refuelling the six-jet-powered B-47 from piston-powered Boeing KC-97s, ranging from technical issues to incompatible speeds to lack of crew mastery, made in-flight refuelling a risk that SAC planners sought to mitigate. They elected to use the same temporary solution for the B-47 as they had for SAC's B-29 and B-50 force: forward basing in the UK and North Africa.

Early plans called for 195 B-47s and 65 RB-47 photo-reconnaissance variants at British bases during any pre-war buildup, reaching 390 B-47s and 130 RB-47s by the time the prospective war erupted. In January 1953 SAC sought to validate these plans by deploying B-47Bs of the 306th Bombardment Wing (BW) from MacDill Air Force Base (AFB) in Florida to the UK in May that year. The Commander-in-Chief of SAC (CINCSAC), Gen Curtis E. LeMay, rejected this proposal as "premature", owing to the lack of combat-ready crews, and because the 306th BW had yet to execute a successful simulated Emergency War Plan (EWP) evaluation.

Efforts to assess the operational readiness of the newly delivered B-47 had been planned since August 1952, but were repeatedly deferred owing to delivery delays,

USAF VIA AUTHORS

ABOVE ***As a prelude to the type's first deployment to Europe, the B-47Bs of the 367th BS, 306th BW — including 51-2206 seen here — took part in Project*** **Sky Try,** ***an evaluation of the aircraft's operational bombing capabilities, in the USA. Note the 306th BW's badge on the forward fuselage, bearing the unit's motto: "Abundance in Strength".***

logistics issues and lack of combat-ready crews. This was eventually known as Project *Sky Try*, and a 30-day test was put in train to "determine the suitability of the modified [Phase II] B-47B to support the [SAC] War Plan; determine the logistic support required to sustain one B-47 squadron at maximum operational capability under simulated combat conditions, and test the adequacy of a tentative TO [technical order] to support, maintain and operate a B-47B squadron under simulated combat conditions".

Among other improvements, Phase II B-47Bs were to have a maximum weight of 200,000lb (90,700kg) with external assisted take-off (ATO) equipment, as well as improved electronic countermeasures (ECM) and bombing/navigation systems. Importantly, the evaluation would reveal what modifications were necessary for the B-47B to be declared "mission-ready".

PROJECT *SKY TRY*

The original plans called for the test to take place during November 1952, but bureaucratic wrangling among the four participating commands — SAC, Air Materiel Command (AMC), Air Proving Ground Command (APGC) and Air Defense Command (ADC) — made this impracticable. Moreover, AMC and APGC argued that SAC's proposal to conduct the evaluation in the UK was a bad idea, given the complex overseas logistics and the lack of prior UK B-47 operations, and instead insisted that the test be undertaken at MacDill AFB.

Project *Sky Try* finally took place during January 22–February 19, 1953, using 15 Phase II B-47Bs assigned to the 367th Bombardment Squadron (BS) of the 306th BW at MacDill. The test included "day and night penetrations of [ADC] areas; RBS [Radar Bomb Scoring]; camera attacks, T-59 [simulated Mark VI atomic] bomb releases; day and night formation raids; day and night bomber stream missions and pre- and post-target air-to-air refuelling".

The results were surprisingly good. The 367th flew ten missions made up of five day, two night and three day/night RBS profiles over cities including Richmond, Virginia and Denver, Colorado. Five of the missions included in-flight refuelling, with one of these involving pre- and post-strike refuelling, with 87 out of the 88 air refuellings being successful. The average time from "start descent" to "initial contact" with a tanker was 15min 48sec, with an average of 3,093lb (1,403kg) of fuel transferred per minute. Flight times ranged from 7hr 30min to 11hr 55min over distances of between 3,095 nautical miles (5,732km) and 4,655 nautical miles (8,621km) and at speeds varying from the optimum cruise speed of Mach 0·74 to the maximum speed of M0·83.

North American F-86 Sabre fighters intercepted seven of the ten missions. Of the total of 150 planned sorties, 126 (84 per cent) were effective over the target and 109 (72·7 per cent) finished the mission completely. Of the aborts, 21 were the result of pre-strike radar failure with the remainder owing to problems with in-flight refuelling and systems failures. During the fourth mission on January 31, bad weather forced 14 Stratojets to divert to Hunter AFB in Georgia. Maintenance teams were flown to Hunter, allowing the B-47s to return to MacDill the next day in order to maintain the required operational timing. None of the B-47s was ever out of commission owing to a lack of parts.

COLONEL MICHAEL N.W. McCOY

COLONEL MICHAEL Norman Wright McCoy (born October 9, 1905) was a distinguished pilot and highly respected commander. He served in the Royal Canadian Air Force during 1939–42 before transferring to the USAAF. McCoy led SAC's first B-47 Wing and the first B-47 overseas operational deployment. The first B-47B delivered to the 306th BW, serial 50-0008, was named *The Real McCoy!* (pictured **RIGHT** with McCoy in the cockpit).

Sadly, McCoy died on his 52nd birthday in the crash of 321st BW Boeing DB-47B serial 51-2177 near Winter Park, Florida, on October 9, 1957, during a 2hr local mission and instrument check from Pinecastle AFB. Also aboard was the RAF's Gp Capt John Woodroffe, RAF Wittering's station commander and commanding officer of the RAF Vickers Valiant bomber detachment visiting Pinecastle for the annual SAC bombing competition.

BOEING HS5665

According to witnesses, the Stratojet was at 1,500ft (460m) and at high speed when it began a turn. The bank angle rapidly reached nearly 90°, and white smoke or fuel vapour appeared at the wing root before the aircraft disintegrated. At the time of the crash, McCoy was in the front seat and Woodroffe was in the copilot's position. All four on board — McCoy, Woodroffe, Lt-Col Charles Joyce, 321st BW Deputy Commander for Operations and Maj Vernon D. Stuff — were killed. Investigation revealed that the lower fuselage longeron exceeded design g limits and failed. On May 7, 1958, Pinecastle AFB in Florida was renamed McCoy AFB in the Colonel's honour. **CMH & RSH**

Commanders were cautious about being overly optimistic with the B-47's performance during *Sky Try*, as summarised in the final report:

"Certain important deficiency areas, principally in the bombing and defensive armament systems, presently impose serious limitation[s] on the aircraft's combat effectiveness. Increased design complexity and the impact of the more severe operating requirements introduced by higher aircraft performance have had their effects on the reliability of these systems and the training criteria for operators and maintenance personnel.

"Until the B-47 is equipped with an acceptable armament system with which to defend itself against the type of interceptor attack which will probably be used against it, the aircraft will be forced to operate under a serious tactical penalty."

The "K-system" for bombing/navigation was the primary weakness, with some 215 in-flight malfunctions reported. Of these, 26·7 per cent of the aircraft reported a failure before reaching the first target and 32·7 per cent aborted before the second target. The B-4 gun turret, coupled with the AN/APG-30 tracking radar, had a 60–64 per cent failure rate which "increased with cold soaking". Moving the turret left or right caused the aircraft to yaw significantly, and the empennage hindered visual sighting of targets. During daylight hours 51 per cent of intercepts resulted in effective firing passes on the B-47s, although this dropped to 21 per cent during darkness.

Despite the numerous shortcomings identified during *Sky Try*, SAC commanders were sufficiently encouraged by the B-47's performance to move ahead with the type's first overseas deployment. On March 7, 1953, SAC directed the 306th BW to prepare for an initial 90-day rotation to the UK.

OFF TO ENGLAND

After many delays in production and operational preparedness, SAC was finally ready to send its newest bomber to England, beginning with an exploratory visit. Colonel Michael N.W. McCoy, commander of the 306th BW, led a pair of B-47Bs from MacDill to RAF Fairford in Gloucestershire.

Departing MacDill on April 6, 1953, the pair stopped at Limestone AFB in Maine for refuelling, and then proceeded to England, setting an

After Col McCoy's two-aircraft proving flight to the UK and back in April 1953, the 367th, 368th and 369th BSs prepared their aircraft and flew from their base at MacDill, Florida, to Limestone AFB in Maine, where one tranche of the B-47Bs is seen here refuelling before setting off across the Atlantic for RAF Fairford during June 2–4 the same year. BOEING BW90077

BOEING BW90190

ABOVE ***Trailing its braking parachute, B-47B serial 51-2271 of the 367th BS lands at RAF Fairford to join other Stratojets of the 306th BW in the first week of June 1953. Individual aircraft names were uncommon, as were special markings, although some of the B-47s sported arrow insignia on their engine nacelles.***

BOEING BW90061

RIGHT ***Brig Gen Henry K. Mooney (left) welcomes Col Michael McCoy to Limestone AFB on April 6, 1953, during the latter's route-proving B-47 flight to the UK. Mooney was the Commander of Strategic Air Command's Sixth Air Division and had deployed to Limestone ahead of McCoy's two-aircraft formation.***

unofficial average speed record of 553·8 m.p.h. (891km/h) en route. However, the two aircraft did not reach RAF Fairford, diverting instead to RAF Brize Norton in Oxfordshire on April 7, when issues with the crews' anti-exposure suits caused incipient hypothermia, one source reporting that McCoy was "incapacitated" by his suit, but recovered before landing. The two eventually visited other bases, including RAF Lakenheath in Suffolk on April 14.

What McCoy found was problematic. The runway at RAF Fairford was the requisite 10,000ft (3,050m) in length but had no overruns. Lines were hastily painted 100ft (30m) from each end of the runway to create these overruns, reducing the overall length to 9,800ft (2,990m), with resulting penalties in fuel load and take-off performance. Ultra-high frequency (UHF) radios were largely non-existent, and ground-controlled approach (GCA) facilities were "primitive" by SAC standards.

McCoy returned to the USA on April 21 to oversee final preparations for the 306th's deployment, which drew considerable press attention. On May 22, for example, USAF Vice-Chief of Staff General Nathan F. Twining announced that the 306th would deploy to the UK "as part of the Air Force's established programme for maintaining the mobility of Strategic Air Command".

McCoy led the full Wing's deployment to Fairford, with the 45 B-47Bs departing MacDill in three waves during June 2–4, 1953. A total of 22 KC-97Es from the 306th Air Refuelling Sqn (ARS) deployed to Harmon AFB, Newfoundland, where they could refuel any B-47 in case of emergency, but no air refuelling was planned for the trip to the UK. These KC-97s eventually relocated to RAF Mildenhall. Each B-47 routed through Limestone, with 15 reaching Fairford on June 4; 12 on the 5th; 16 on the 6th and the final two stragglers on the 7th. Several set unofficial speed records en route.

THE BIG LEAGUE AND WORLD SERIES

Once in the UK the B-47s flew frequently to familiarise their crews with the environment and ground-support personnel with the new aircraft. Each crew typically flew every three days, accruing some 50hr of flight time per month. Weather was an unexpected problem, with unseasonal fog forcing the Wing to lower the approach minima from 1,000ft (300m) ceiling and two nautical miles (3·7km) visibility during the day — 1,500ft (460m) and three nautical miles

C. MIKE HABERMEHL COLLECTION

(5·6km) at night — to 300ft (90m) and three-quarters of a nautical mile (1·4km) — 300ft and one nautical mile (1·9km) at night.

The runway at Fairford remained a source of concern. Given its rough finish and the prevalence of stiff crosswinds, crews worried about dragging an outboard engine pod or excessive bumps damaging the aircraft's sensitive electronics. Radar aborts were frequent, although how many were caused by rough taxiways and runways remains unknown. Crew accommodation was still "austere" and overcrowding commonplace. Stockpiles of JP-4 jet fuel were initially inadequate but this issue was quickly overcome. Unplanned "bounces" by friendly fighters were forbidden, and the B-47s were prohibited from any flight operations closer than 300 miles (560km) from the Soviet Union or communist-bloc areas.

During June 29–30, 1953, the Wing took part in Operation *Big League*, designed to test its capability against continental targets. The results were poor, largely owing to weather issues, resulting in additional training missions in July. These produced the desired results during a simulated EWP mission flown on July 16. All 44 planned launches took place, and 40 missions were "effective" over the target. The following week the unit participated in Exercise *World Series* with similar results.

The deployment received LeMay's personal attention while visiting the UK during May and June and of Vice-CINCSAC Maj Gen Thomas Power during August and September. Six B-47Bs relocated to Nouasseur in the French protectorate in Morocco on August 12 under Operation *Safari* to evaluate its possibilities.

Sadly, the deployment was marred by the loss of B-47B serial 51-2267 at RAF Upper Heyford in Oxfordshire on July 2. Following a training sortie from Fairford the aircraft was due to land at Upper Heyford "for a ground training mission in conjunction with special weapons" (no atomic weapons or their components were carried during the flight; they were to be loaded and unloaded at Upper Heyford). Witnesses reported that the Stratojet appeared to fly a tighter-than-normal downwind and base leg compared to the two B-47s that preceded it. To align with the runway, the aircraft reached 60–75° of bank and

ABOVE ***Wearing SAC's distinctive blue star-spangled band and badge on its forward fuselage, 51-2094 was one of the 369th BS, 306th BW B-47Bs that deployed to the UK in June 1953. Note also the assisted take-off (ATO) panel forward of the star-and-bars; these were removed for the 1953–54 UK deployments.***

BELOW ***Stratojet 51-2206 of the 367th BS awaits its next sortie at Fairford in the summer of 1953. Interestingly, the outer wings of this B-47B have been painted red, although the majority of 306th BW Stratojets were not so marked. The SAC blue band was not adopted until after the 306th's return.***

HAROLD SIEGFRIED VIA AUTHORS

USAF VIA AUTHORS x 2

ABOVE LEFT ***From left to right: Maj J.W. Cotton, Lt Gilbert E. Bigdon and Capt Gayle C. Miller of the 22nd BW pose for a photograph at Sidi Slimane in Morocco while on detachment from Upper Heyford in 1954.*** **ABOVE RIGHT** ***The Stratojets' empty ATO compartments found good use as baggage stowage areas — as seen here.***

entered an accelerated stall. The pilot recovered but again stalled the aircraft trying to clear a hedgerow, striking the ground tail turret first. The aircraft began to disintegrate as it slid through the Oxford—Banbury railway embankment. All four crewmen perished.

The 306th BW returned directly to MacDill in three waves departing on September 4–6, with each B-47 refuelled en route. The B-47's foreign debut was a general success — but there were still significant operational issues to resolve.

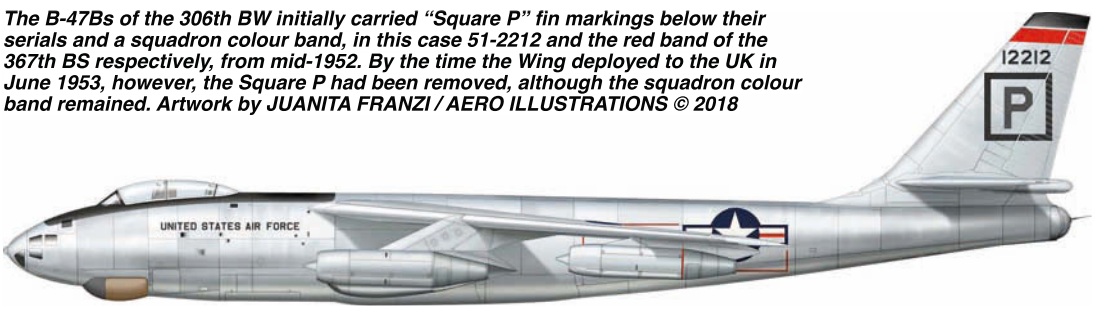
SECOND TO NONE

Addressing these issues fell to the 305th BW, also from MacDill AFB. A total of 45 B-47Bs replaced those of the 306th BW, although at Brize Norton instead of Fairford. Of these, 12 arrived on September 4, 1953; 14 on September 5; 16 on the 6th and the final three on the 7th, with 22 KC-97E/Gs from the 305th ARS proceeding to RAF Mildenhall. The 305th experienced the same problems as the 306th — inadequate UHF radio and GCA facilities, bad weather complicating the use of both visual and radar RBS ranges (notably at Heston) and British bases in general. Consequently, visual bombing practice took place at the Ksar-es-Souk (now Errachidia) range and Marrakesh RBS site in Morocco.

The 305th's Stratojets visited the RAF bases at Lakenheath, Greenham Common and Upper Heyford to assess their suitability for future B-47 operations, as well as to introduce base personnel to the state-of-the-art bomber. The 305th also planned to send an initial group of 15 B-47s and five KC-97s to Sidi Slimane AB in northern Morocco, but only one B-47 and the five KC-97s made the trip. On November 2, 41 B-47s finally managed to reach Sidi Slimane, returning to Brize Norton over the next four days.

The 305th's Stratojets departed for home in three tranches, with 16 on December 5; 15 on the 6th and 14 on the 7th. The aircraft flew non-stop with one air refuelling en route, although strong headwinds on December 6 forced 11 diversions into Hunter AFB in Georgia, Langley AFB in Virginia and Limestone AFB.

The B-47Bs of the 306th BW initially carried "Square P" fin markings below their serials and a squadron colour band, in this case 51-2212 and the red band of the 367th BS respectively, from mid-1952. By the time the Wing deployed to the UK in June 1953, however, the Square P had been removed, although the squadron colour band remained. Artwork by JUANITA FRANZI / AERO ILLUSTRATIONS © 2018



BOEING BW90079

ABOVE ***Col G.P. Birdsong (far right), Commander of the 369th BS, flew a record-setting B-47 flight from Fairford to MacDill via Dayton on September 6, 1953.***

By the end of 1953 the 22nd BW had completed plans for the high-profile deployment of ten of its new refined B-47Es to fly non-stop from March AFB in California to Upper Heyford using in-flight refuelling, with another 35 routing through Limestone. The unit's KC-97s would fly from March to Griffiss AFB, New York, and then to RAF Mildenhall. However, poor weather, both in Maine and in the UK, played havoc with the deployment of the 45 Stratojets.

In the event, the first 15 departed March on December 3 and arrived at Limestone, but severe fog in the UK prevented them from flying the next leg to Upper Heyford. Fog remained a problem and the 15 Stratojets were grounded at Limestone until December 11, when eight managed to depart for England, five reaching Upper Heyford and three diverting to Brize Norton and Mildenhall. On the same day, the remaining 30 B-47s at March, including those originally slated to fly non-stop to Upper Heyford, arrived at Limestone. Again, the Oxfordshire base was closed owing to extreme fog, prompting SAC to request permission to launch the B-47s now stranded at Limestone in the hope that they could arrive in England, but with the ability to divert to Sidi Slimane should weather preclude landing in the UK. Accordingly, 20 of the 37 B-47s now at Limestone prepared to depart on December 19, but while awaiting take-off they suffered unanticipated wing icing. Limestone's lone de-icing truck managed to clean only five B-47s, which managed to get away before the take-off window closed.

As if this "goat rope" were not sufficiently troublesome, SAC approved the launch of the remaining 32 B-47s from Limestone in pairs and triplets, destined for any available UK base, or Sidi Slimane should a diversion be necessary. (The KC-97s suffered similar diversions, routing through Prestwick, Scotland and RAF St Eval in Cornwall en route to RAF Mildenhall.)

On December 21, 20 B-47s left Limestone in pairs and triplets, leaving 12 on the ground in Maine owing to mechanical problems. Efforts to launch these the following day failed when bad weather again struck Limestone. The weather finally co-operated on December 24, by which time some 34 of the Stratojets had reached their ultimate destination at Upper Heyford. Of these, 11 came from Limestone, nine from Sidi Slimane, seven from Brize Norton and the remaining seven from Mildenhall. The final 22nd BW jets arrived at Upper Heyford on Christmas Day, ending what had turned into a 23-day outbound journey.

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UK B-47 RECORD FLIGHTS, 1953

August 4 RAF Fairford—MacDill AFB, Florida; 4,450 nautical miles (8,240km) in 9hr 53min; average speed 454 m.p.h. (731km/h); Col Elliott Vandevanter Jr, Lt-Col Robert Michie, Maj William Richards Jr

August 4 RAF Fairford—Hunter AFB, Georgia; 4,151 n.m. (7,687km) in 9hr 26min; average speed 440 m.p.h.(708km/h); Lt-Col James Smith, Lt-Col Don Frank, Maj Gene Dawson

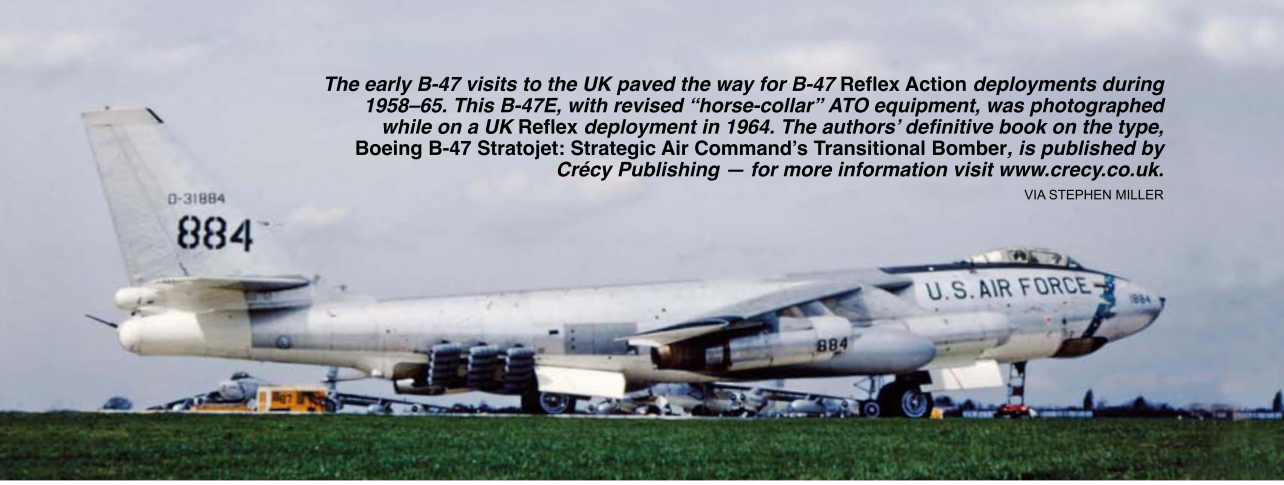
September 4 RAF Fairford—MacDill AFB in 9hr 13min; average speed 508·8 m.p.h. (819km/h); Col Michael McCoy

September 6 RAF Fairford—MacDill AFB via Dayton, Ohio; "longest operational jet flight" (see commemorative cover **ABOVE**); 12hr 15min; B-47 serial 51-2287; Col G.P. Birdsong

November 5 Limestone AFB—RAF Fairford; 3,120 n.m. (5,778km) in 4hr 43min; average speed 661 m.p.h. (1,064km/h); 305th BW's Maj H.B. Howard

December 14 RAF Fairford—MacDill AFB in 8hr 53min; average speed 504·3 m.p.h. (812km/h); 305th BW's Col William E. Creer

December 23 Limestone AFB—RAF Upper Heyford; 2,970 n.m. (5,500km) in 4hr 34min; average speed 650·5 m.p.h. (1,047km/h); 22nd BW's Capt Russell Bishop **CMH & RSH**



The early B-47 visits to the UK paved the way for B-47* Reflex Action *deployments during 1958–65. This B-47E, with revised "horse-collar" ATO equipment, was photographed while on a UK* Reflex *deployment in 1964. The authors' definitive book on the type,* Boeing B-47 Stratojet: Strategic Air Command's Transitional Bomber, *is published by Crécy Publishing — for more information visit www.crecy.co.uk.

VIA STEPHEN MILLER

These lessons were not lost on SAC planners, who had failed to account for the need for more than one de-icer at Limestone or the impact of bad weather, not only on the mission aircraft, but also on the KC-97 and Douglas C-54 and C-124 support aircraft. Weather minima in the UK of 1,500ft (460m) ceilings with three-mile visibility were often unobtainable, preventing arrivals from the USA or local operations in general. In addition, the 22nd BW had just converted from B-47Bs to B-47Es, and many had been sitting idle for weeks in the warmer climate of California or at Davis-Monthan AFB in Arizona, where they had undergone the *Baby Grand* update (incorporating the installation of the twin 20mm A-5 tail gun and fire-control system in 53 B-47Es, serials 51-2357 to 51-2411, although 51-2389 and 51-2392 were not modified as they were destroyed before delivery). Arriving in the icy conditions at Limestone seriously undermined their ability to operate in all weather conditions without degradation — an issue which significantly worried SAC planners.

INTO HIGH GEAR

In January 1954 a total of 15 B-47s of the 22nd BW and ten KC-97s departed Upper Heyford for Wheelus AB in north-west Libya to participate in an exercise. On February 17, some 44 B-47Es and 22 KC-97s deployed to Sidi Slimane and Wheelus to take part in a *High Gear* exercise (also known as *Quickswitch*), along with 33 B-47s from the 301st BW already present at Sidi Slimane. The rotations to North Africa were essential to maximise the exposure of B-47 crews and support personnel to all available overseas bases before the start of any potential conflict. They also had the effect of raising the morale of crews who had suffered a cold and foggy deployment to England, and were rewarded with the better weather in North Africa, although winter there could be equally fickle.

February 1954 also saw the second loss of a UK-based Stratojet when B-47E serial 52-0023 of the 2nd BS, 22nd BW, crashed at Upper Heyford on the 8th. During a pre-dawn approach in night visual flight rules (VFR) conditions, the aircraft was well below its final-approach altitude. When the pilot turned on the landing lights he saw trees ahead, pulled up abruptly and stalled the aircraft. It struck 58ft (18m)-tall trees at Stoke Wood near Ardley, dropped the starboard wing, cartwheeled, and exploded approximately 1½ miles (2·8km) from the end of the runway at Upper Heyford. All four on board perished. The resulting investigation revealed that the pilot was directed to fly a left-hand visual pattern but instead flew a right-hand visual pattern and was 500ft (150m)

The new world meets the old country — B-47Bs of the 367th BS face a typically dilapidated building beside the ramp at Fairford in the summer of 1953. The 306th's operations were frequently curtailed by wet weather, which turned the ground into mud, while the low overcast hindered approaches and landing.

HAROLD SIEGFRIED VIA AUTHORS

too low. Moreover, the pilot's altimeter read 29·52in of mercury instead of the correct 29·62, which was properly set on the copilot's altimeter. This caused the pilot to believe that he was at the correct altitude instead of too low, and the copilot failed to challenge the improper altitude.

The return trip to March AFB was less disrupted, with most of the aircraft reaching home during March 3–7, 1954.

IN RETROSPECT

What seemed to have been an ongoing circus act of operational shortcomings, deployment miscues and inadequate facilities and preparations paints a disappointing portrait of the first B-47 deployments to the UK. However, aside from the losses of two aircraft and their crews, these three deployments did exactly what they were intended to do — provide SAC with the necessary experience to be able to deploy multiple BWs to bases in the UK in times of increasing international tension, and have them ready to execute their EWP if required. Subsequent 90-day movements gave way to more reasonable 15-day *Reflex Action* deployments, which began in 1958 and fulfilled SAC's forward-alert requirements more economically and with less adverse impact on morale and unit readiness.

By the time B-47 deployments to the UK ended in 1965, the Stratojets had been at readiness in the UK during the Soviet invasion of Hungary and the Suez Crisis, both in 1956; the 1958 Lebanon Crisis; the 1961 Berlin Crisis and the 1962 Cuban Missile Crisis. None of these alert positionings would have served as credible deterrents without the successes and failures of the first three B-47 deployments.

ACKNOWLEDGMENTS *The authors would like to thank Colin R. Smith for the invaluable compiling and generous sharing of his extensive research*

SAC B-47s DEPLOYED TO UK, 1953-54

306th Bombardment Wing (BW) B-47Bs

367th Bombardment Squadron (BS)
51-2076; 51-2087; 51-2193; 51-2206; 51-2212; 51-2220; 51-2225; 51-2230; 51-2234; 51-2240; 51-2246; 51-2251; 51-2254; 51-2257; 51-2271

368th BS
51-2070; 51-2074; 51-2075; 51-2082; 51-2084; 51-2091; 51-2124; 51-2267; 51-2276; 51-2277; 51-2278; 51-2282; 51-2283; 51-2295; 51-2296

369th BS
51-2081; 51-2094; 51-2099; 51-2105; 51-2260; 51-2263; 51-2269; 51-2272; 51-2273; 51-2284; 51-2287; 51-2291; 51-2294; 51-2298; 51-2299

305th BW B-47Bs

364th BS / 365th BS / 366th BS (allocations unknown)
51-2192; 51-2202; 51-2210; 51-2211; 51-2217; 51-2224; 51-2227; 51-2231; 51-2237; 51-2243; 51-2289; 51-2290; 51-2302; 51-2303; 51-2305; 51-2306; 51-2307; 51-2308; 51-2309; 51-2310; 51-2314; 51-2315; 51-2316; 51-2317; 51-2318; 51-2319; 51-2320; 51-2321; 51-2322; 51-2323; 51-2324; 51-2325; 51-2326; 51-2327; 51-2329; 51-2330; 51-2332; 51-2333; 51-2334; 51-2335; 51-2336; 51-2338; 51-2340; 51-2341; 51-2342

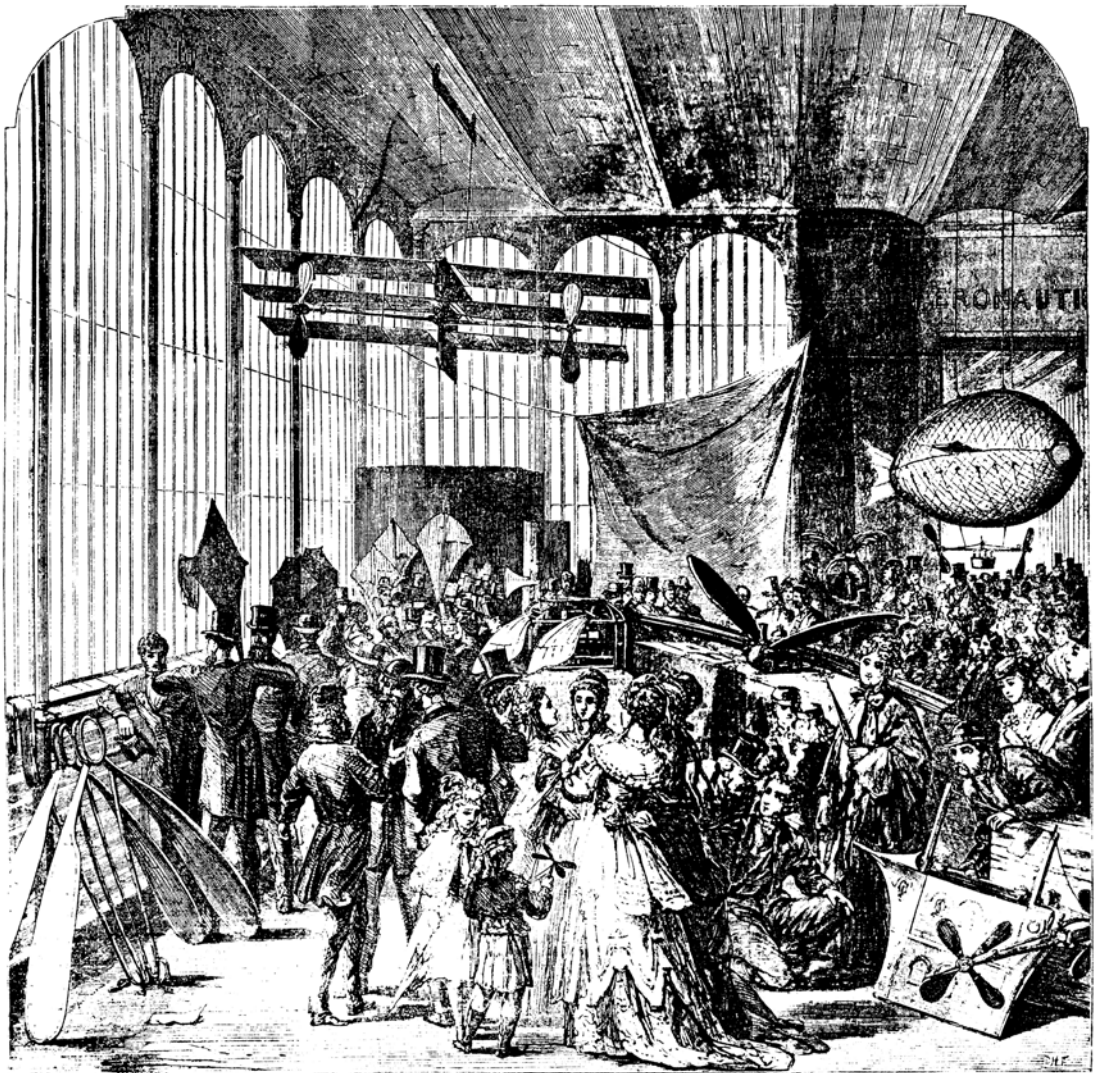
22nd BW B-47Es

2nd BS
51-2364; 51-7081; 51-15809; 51-15810; 52-0023; 52-0024; 52-0025; 52-0027

19th BS
51-2368; 51-7033; 51-7062; 51-7074; 51-15808; 51-17368; 51-17370; 51-17371; 51-17380; 52-0028

33rd BS
51-2361; 51-2365; 51-2366; 51-7067; 51-7071; 51-7076; 51-7077; 51-7078; 51-15806; 51-15807; 51-15811; 51-17377

Unidentified BS
51-2367; 51-2370; 51-5253; 51-7052; 51-7064; 51-7065; 51-7068; 51-7072; 51-7079; 51-7082; 51-7083; 51-17369; 51-17372; 52-0022; 52-0026



PHILIP JARRETT COLLECTION

THE WORLD'S FIRST AERONAUTICAL EXHIBITION

With 2018 marking 70 years since the first SBAC airshow at Farnborough, we celebrate the 150th anniversary of the first aeronautical exhibition to be held anywhere in the world, an 11-day event organised by the Aeronautical Society of Great Britain in the summer of 1868. **PHILIP JARRETT** takes a look at the state of the flying arts in the mid-Victorian era

INCREDIBLE as it may seem, June 25 this year marked the 150th anniversary of the opening of the world's first aeronautical exhibition. This extraordinary event, which took place at the Crystal Palace (**BELOW**) at Sydenham Hill, South London, for 11 days, from Thursday June 25 to Sunday July 5, 1868, was organised by the Aeronautical Society of Great Britain (ASGB — now the Royal Aeronautical Society). It had been founded only two years earlier, in January 1866, with heavier-than-air flight as its principal interest.

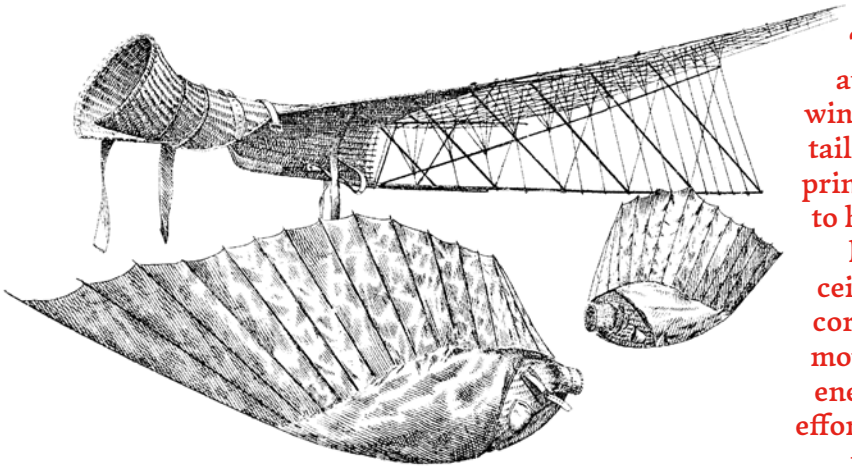
Although the ASGB had only 65 members at the end of its first year, there was a growing worldwide interest in the possibility of manned flight. Consequently, at a Council meeting at Lincolns Inn Fields, London, on August 21, 1867, its enthusiastic Honorary Secretary, Mr Fred Brearey, boldly proposed "that an Exhibition of Machinery and Articles connected with Aeronautics should be organised for 1868", and produced a draft circular which he proposed should be sent to members and friends of the Society "to test the feasibility of the project". After some "emendations and additions" this was adopted, and Brearey was directed to communicate with the Society's President, the Duke of Argyll, on the matter.

FAVOURABLE ARRANGEMENTS

By the time of the next Council meeting, in London's Savile Row on October 4, 1867, Brearey was able to read lists of promised machinery and apparatus and of guarantors, and it was decided to proceed with the project "in the hope that pecuniary support would still be afforded and that the names of Guarantors . . . would be materially increased". The circular was approved for distribution and Brearey reported that he had had an interview with Mr Bowley of the Crystal Palace Co, and that, following a second visit, accompanied by Council member Mr Le Feuvre to negotiate terms for holding the Exhibition at that venue, "favourable arrangements might be made". At the Council meeting of November 15 Brearey submitted a list of guarantors and exhibitors and reported on his interviews with Mr Bowley, as well as the Secretary of the Alexandra Park Co, a possible alternative venue, and the Secretary of the Shipwrecked Mariners' Society. The latter had awarded £50 as a prize to be awarded for "the best form of kite or other aerial arrangement, or modification thereof, for establishing a communication from a wreck on shore, or between two vessels at sea".

It was hoped to have a captive balloon in the grounds in which visitors could make ascents, and the French balloonist Henri Giffard was approached to provide this.

OPPOSITE PAGE, TOP ***The engraving used on the front page of the July 4, 1868, issue of the*** **Illustrated Times.** ***John Stringfellow's triplane is suspended on its wire, with a canvas sheet to arrest it in the distance. In the foreground on the left is William Gibson's "aerial apparatus". In the background, from left to right, are an assortment of kites, Duncan McPhail's Aerial Steamship, Kaufmann's model of his "Airmotive Engine" and George Ansell's fish-shaped balloon. At bottom right is the car of Henson and Stringfellow's*** **Ariel** ***model. Both of Stringfellow's machines are incorrectly shown with shaft drives to their propellers.***



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ABOVE ***The tail and wings of trapeze artist Charles Spencer's Aerial Apparatus. Based on the classic paper dart, the tail, shown here uncovered, was attached to the operator by means of a wickerwork "corset". The complete apparatus, demonstrated to Dr Abel Hureau de Villeneuve (with unsurprising results), weighed a mere 18lb (8kg).***

"Spencer, having attached feathered wings to his arms and a tail 'constructed on the principle of a boy's dart' to his back, suspended himself from the ceiling with a vertical cord and proceeded to move his arms and tail energetically . . . these efforts were not crowned with success . . ."

On January 23, 1868, an Exhibition Committee comprising Messrs Henry Wright, William Le Feuvre and Brearey was appointed to confer with the Crystal Palace directors. James Brown, A. Alexander, James Glaisher and F.H. Wenham were subsequently added to their number. It was resolved that upon Le Feuvre and Wright guaranteeing the repayment of any costs the company may overspend not exceeding £50 in the event of the Exhibition, the Crystal Palace Co would undertake to advertise the proposal to hold an Aeronautical Exhibition. The company would also offer £50 towards a prize of £100 for a machine to carry and be worked by a steam engine, which shall sustain and move itself in the air at a height of not less than 10ft (3m) from the ground for a period of not less than 20min, the ASGB to contribute the other half of the prize. This was subsequently amended to allow other motive power besides steam, and the required duration of the flight was reduced to 5min. It was also decided to award the ASGB's £50 share separately to "the lightest engine in proportion to its power from whatever source the power may be derived".

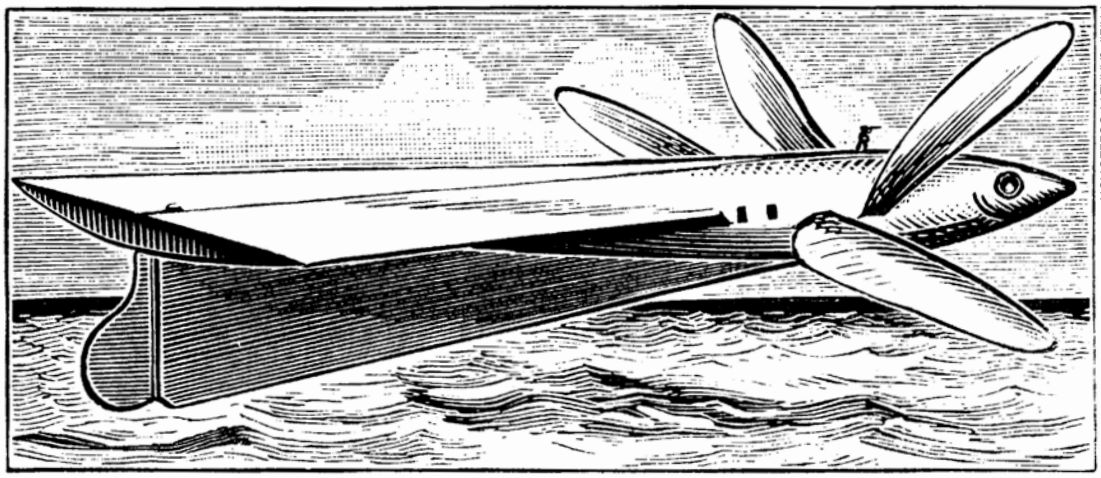
Various ASGB members became guarantors, contributing sums of money to increase the various prizes, and the total for the light engine prize reached £100. Another £100 prize was offered by the Duke of Sutherland to the inventor of a machine which, being neither a kite nor a balloon, would lift a man to a height of 120ft (37m). Altogether, the prize money totalled an impressive £300.

The Council also reserved to itself "the power of testing the machines & apparatus submitted, in any way [it] think[s] necessary to arrive at the relative intrinsic value of the machines offered by competing candidates". It also reserved the right to modify the reward should no machine of sufficient merit be submitted. The testing day for light engines etc was fixed for Wednesday July 1. It was now hoped to have Mr Henry Coxwell's captive balloon available for tethered ascents.

INTERNATIONAL INTEREST

In France Dr Abel Hureau de Villeneuve, Editor of *L'Aéronaute*, contributed an article on the forthcoming exhibition in the magazine's April 1868 issue, telling his compatriots of the advantages of exhibiting there. The article also recommended the event to manufacturers of materials likely to be used in aeronautics, such as silk and cotton, varnishes and oils, propellers, rudders, inclined planes, barometers, anemometers, compasses, bamboo cane, spruce and hardwoods, steel and, prophetically, aluminium and its alloys. He also encouraged French inventors to exhibit in the hope that they might interest English capitalists in their schemes. However, he wisely observed that the successful flying machine was not likely to result from the work of one man, but would require much science, organisation and capital. Villeneuve, who highly praised the ASGB's sagacity in offering its prizes, stressed the fact that practical results must wait for the production of light motors. He added that every inventor who exhibited a machine believed that he had solved the problem of aerial navigation, but that the public did not believe them and neither did he, though he feared his statement might annoy the inventors. Villeneuve was officially accredited to the exhibition by the French scientific societies.

At the time, some English newspapers had announced that J.M. Kaufmann had constructed a machine with a 50 h.p. steam engine which was shortly expected to fly, and that Mr Charles Spencer, a leading gymnastics teacher and trapeze artist, had flown 250ft (75m) at a height of 25ft (7·5m). Villeneuve went to see Spencer, who, having attached 7ft (2m) feathered wings



PHILIP JARRETT COLLECTION

ABOVE ***Spencer also tried — unsuccessfully — to patent this ambitious full-size paper-dart-based "Manumotive Flying Machine" in 1868. It was to be propelled by a "person actuating suitable propeller-fins". Note the tiny figure with a telescope between the forward fins in this illustration of the machine over the sea, lending a sense of scale.***

to his arms and an 18ft (5·5m)-long, 72ft² (6·7m²) tail "constructed on the principle of a boy's dart" to his back, suspended himself from the ceiling with a vertical cord and proceeded to move his arms and tail energetically. Villeneuve observed that these efforts were not crowned with success.

THE EXHIBITION GETS UNDER WAY

When the exhibition opened on June 25 the catalogue listed no fewer than 77 entries in seven classes: Light Engines and Machinery; Complete Working Aerial Apparatus; Models; Working Models; Plans and Illustrative Drawings; Separate Articles Connected with Aeronautics, and Kites or Other Similar Apparatus. The light engines and machinery, the kites and the working models with steam were on view in the basement, while the models, drawings etc and the working models not requiring steam were displayed in the nave. It was also stated that the balloon *Captif*, piloted by M Delamarne (the approaches to Henri Giffard and Coxwell having proved unsuccessful), would make "repeated ascents to the height of 1,000 feet [300m], which will embrace a view of one-tenth of the whole of England". Members of the ASGB had free admittance to the Crystal Palace and the balloon.

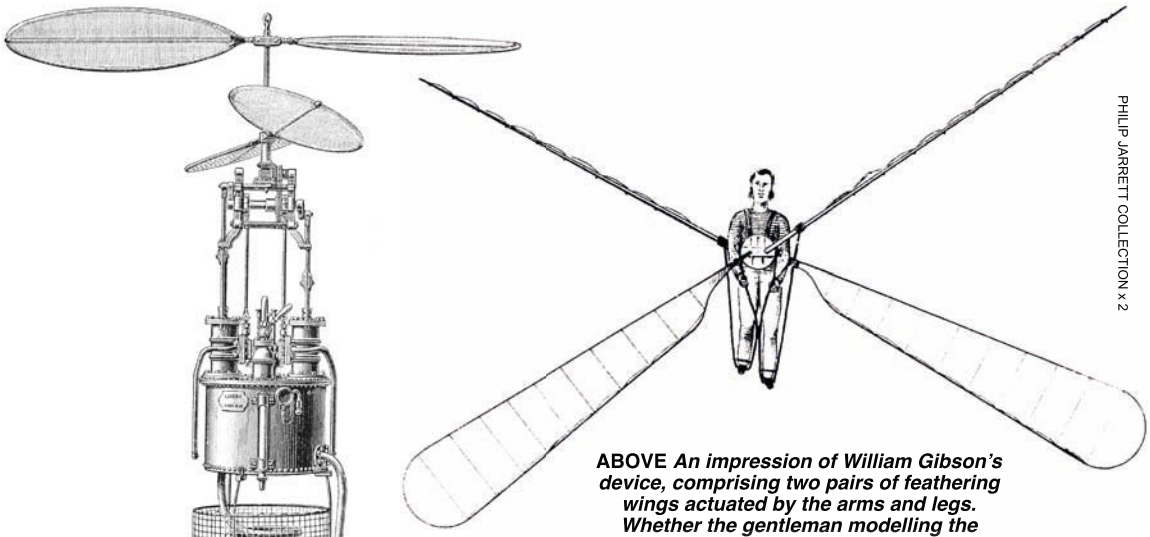
It was evidently felt that the exhibition did not really come up to its organisers' expectations, as it was stated in the preface that: "The limited means at the disposal of the Society has operated prejudicially with regard to giving sufficient publicity to its intention, and many who would have become Exhibitors were informed too late for preparation". A hope of greater things was expressed on the catalogue's title page, where it was stated that this exhibition was "Preparatory to an exhibition upon a large scale in 1869".

It was clearly recognised that a good number of the exhibits were rather more fanciful than practical, and the Society tactfully covered this by saying the following: "It should be borne in mind, in the event of any ridiculous theory being illustrated in some of the objects now to be seen, that the study of aeronautics has been hitherto left to a class for the most part uneducated in mechanical laws, who have in consequence been almost unable to give practical effect to their views, since they could neither themselves construct the apparatus they required, nor did there exist any organised scientific society from whose published proceedings they could gather confirmation or condemnation".

Regarding the Crystal Palace £50 prize, it was pointed out that: "With respect to those models which are capable of flight, a difficulty exists which would seem impossible to overcome. The conditions . . . require a sustaining power of five minutes. In some models the sustaining power can only be acquired by rapidity of motion. Any machine which should fly for five minutes would be quite out of the bounds of the Crystal Palace, and perhaps many miles away, and therefore inapplicable to further exhibition or experiment. Those which work by screw blades in the atmosphere attain increased velocity as they proceed. On account of this difficulty, some mechanical controlling power will have to be exercised". In truth, there was really no prospect of this prize being won, so the Crystal Palace Company's money was safe.

POWER — BUT LITTLE GLORY

Of the 15 engines competing for the £100 prize, seven were to be worked by gas or explosive materials. None of these was shown in motion, and in some cases their inventors failed to explain their action, which left only steam engines to be judged. However, two had no boilers, and three were not shown in motion. Two of the three little light engines were exhibited by the elderly and rheumatic John



PHILIP JARRETT COLLECTION x 2

ABOVE ***An impression of William Gibson's device, comprising two pairs of feathering wings actuated by the arms and legs. Whether the gentleman modelling the apparatus is based on Gibson himself remains unknown!***

LEFT ***The French connection — Viscount Gustave de Ponton d'Amécourt's steam-powered helicopter model, with two pairs of contra-rotating paddles. Its inventor was a friend of Jules Verne, and was reportedly the first to use the term helicopter, in an 1861 patent.***

Stringfellow, who at 68 was now a senior citizen among aviation pioneers, having experimented with large propeller-driven model aeroplanes powered by steam engines in the 1840s. Brearey had persuaded him to submit entries for the exhibition, and he had a "light engine and machinery for aerial purposes" with a 2in (5cm)-diameter cylinder producing about ½ h.p. which started at 100lb (45kg) pressure in 3min and turned two 3ft (0·9m)-diameter propellers at about 300 r.p.m. With 3½ pints (2lit) of water and 10oz of liquid fuel it ran for about 10min. The total weight of engine, boiler, water and fuel was 16¼lb (7·4kg). Stringfellow also displayed an impressive 1 h.p. "copper boiler and fireplace" weighing some 40lb (18kg) and able to sustain a pressure of 500lb/in² (35kg/cm²).

Other entries in this class included the "Chrysalis", "a working model of a gaseous engine, designed to prove, as far as possible, the practicability of air navigation, and by such means to establish communication between distant objects and places with certainty", entered by W. Quartermaine of London. Its motive power was "a species of rocket composition, the gases resulting from the ignition of which give motion to a piston. All danger of explosion is avoided by introducing limited quantities only, to be ignited at one time through self-closing valvular chambers".

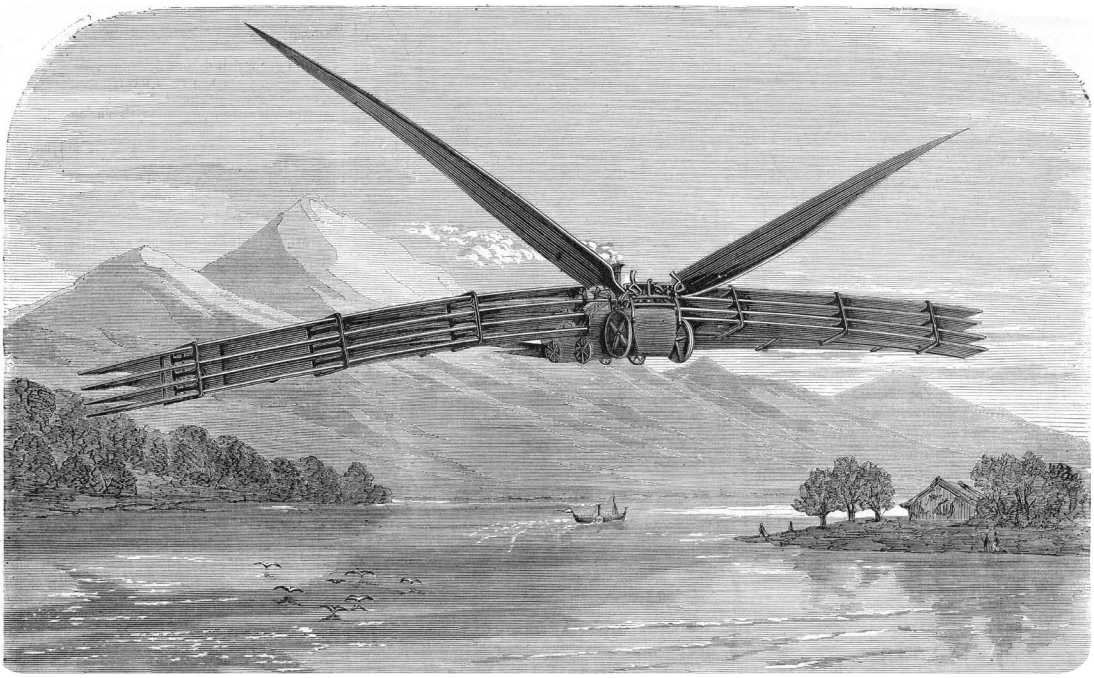
There were only two entries in Class 2. One was Spencer's aforementioned "Aerial Apparatus" built of wickerwork and steel umbrella wires, "which being attached to the body, enables a person to take short flights. The exhibitor . . . has, with less perfect apparatus, accomplished flight to the extent of 160ft [50m], rising from the ground by a preparatory running action". Spencer added the curious caveat that: "Owing to the delay and difficulty of adapting a perfect apparatus to a novel experiment, and the possibility that when complete it may not prove upon trial to be the best form of construction which could have been devised, it is necessary to say that some delay might occur".

The other entry, by William Gibson of Hartlepool, comprised a "complete working aerial apparatus by muscular power", comprising two pairs of wings worked by the feet and arms, "during which action the shafts of the wings swivelled in their sockets, so as to give a feathering movement similar to that observed during the flight of a bird".

MODEL BEHAVIOUR

Among the models in Class 3 was that of Duncan McPhail of Westminster, an Aerial Steamship propelled by four wings giving alternate strokes, and two screw fans, one mounted vertically to assist in ascension and the other mounted horizontally for propulsion, and having "internal space for gas". Also in this section was Kaufmann's model of his "Aeromotive Engine", and a model of a fish-shaped balloon "showing the possibility of obtaining descent without loss of gas or ballast", the invention of George Ansell of the Royal Mint.

The working models in Class 4 included two by Thomas Moy, who was to test an Aerial Steamer at the same location during 1874–75. At the Exhibition he had a model "to illustrate a mode of flying vertically, by direct action on



PHILIP JARRETT COLLECTION x 2

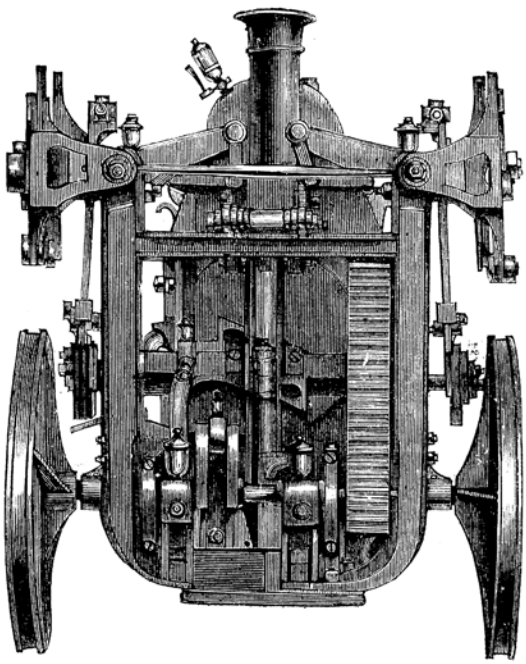
ABOVE ***A somewhat fanciful illustration of J.M. Kaufmann's steam-powered Aeromotive Engine in flight over a bucolic lakeland scene. The illustration was probably based on Kaufmann's ASGB exhibition model of the machine, which had four fixed superposed wings of 16ft (4·9m) span and two large "propulsive wings" of 14ft (2·5m) span.***

the air, without any screw motion in the wings. This model will ascend in a vertical line", and another "to illustrate natural flying, the wings being used to propel and sustain; the tail to sustain only. This model will fly horizontally for a short distance". These capabilities were not demonstrated, however. The Duke of Argyll showed a large ornithopter model using a pair of dried real birds' wings activated by clockwork, which was shown travelling along a wire.

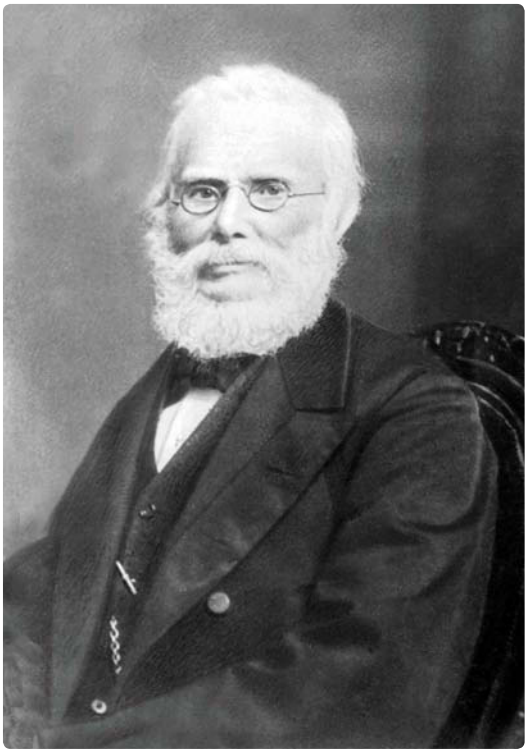
Overseas exhibits in this section included Viscount Gustave de Ponton d'Amécourt's "highly-finished" "*Orthoptère*". One of several such devices on show, this was actually a helicopter with two contra-rotating fans driven by a ¼ h.p. aluminium steam engine. Joseph Liwcsath of Vienna displayed a model air ship "lifting itself by motive power, and capable of being governed in every direction, based upon a system supposed to be not hitherto known, which enables it to work against any lesser currents of air . . . Each cubic foot of the space occupied by the apparatus is capable of carrying half a pound (Vienna weight)".

In the basement, W.H. Phillips displayed and personally explained his Aerial Machine, which was supposed to raise and sustain itself in the air for several minutes, having a "rotary engine, turning, lifting, or driving fans". Paris-based Camille Vert's Aerial Machine, with its steam-powered screws, was said to be "theoretically lighter than the atmosphere, though in reality slightly heavier".

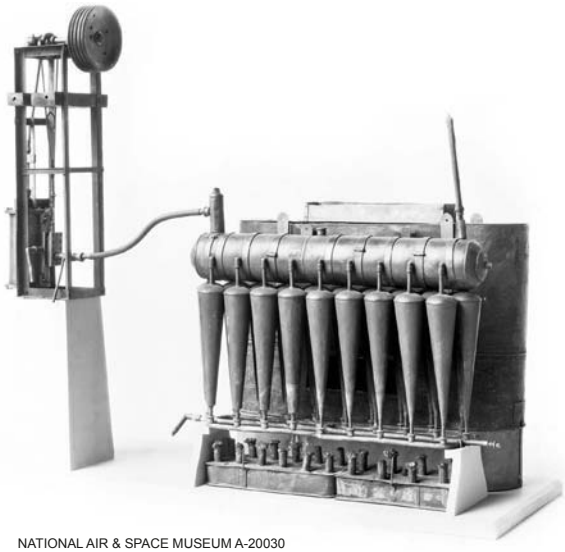
Kaufmann's working model of a "complete airmotive engine" had a total weight not exceeding 115lb (52kg) "including machinery,



ABOVE ***Kaufmann apparently used the name Aeromotive Engine to refer to the entire machine, but its powerplant, seen here in vertical aspect, was a steam engine with boiler shell and chimney, the latter clearly visible at the top centre in this illustration.***



PHILIP JARRETT COLLECTION



NATIONAL AIR & SPACE MUSEUM A-20030

LEFT ***A portrait of British aeronautical pioneer John Stringfellow at 75 years of age, circa 1875.***

ABOVE ***Stringfellow's prizewinning 1 h.p. light steam engine. Somewhat altered by its creator after the 1868 exhibition, it is now preserved at the Smithsonian Institution in the USA, having been bought from Stringfellow's son in 1889 by Prof Samuel Langley.***

boiler shell, wings and aeroplane &c". The "aeroplanes" spanned 16ft (4·9m) and the propulsive wings 14ft (4·25m), the latter making 150 to 200 strokes per minute. The speed, "carrying two persons in the car", was estimated at 12 m.p.h. (19km/h), but the car was not ready in time for the exhibition.

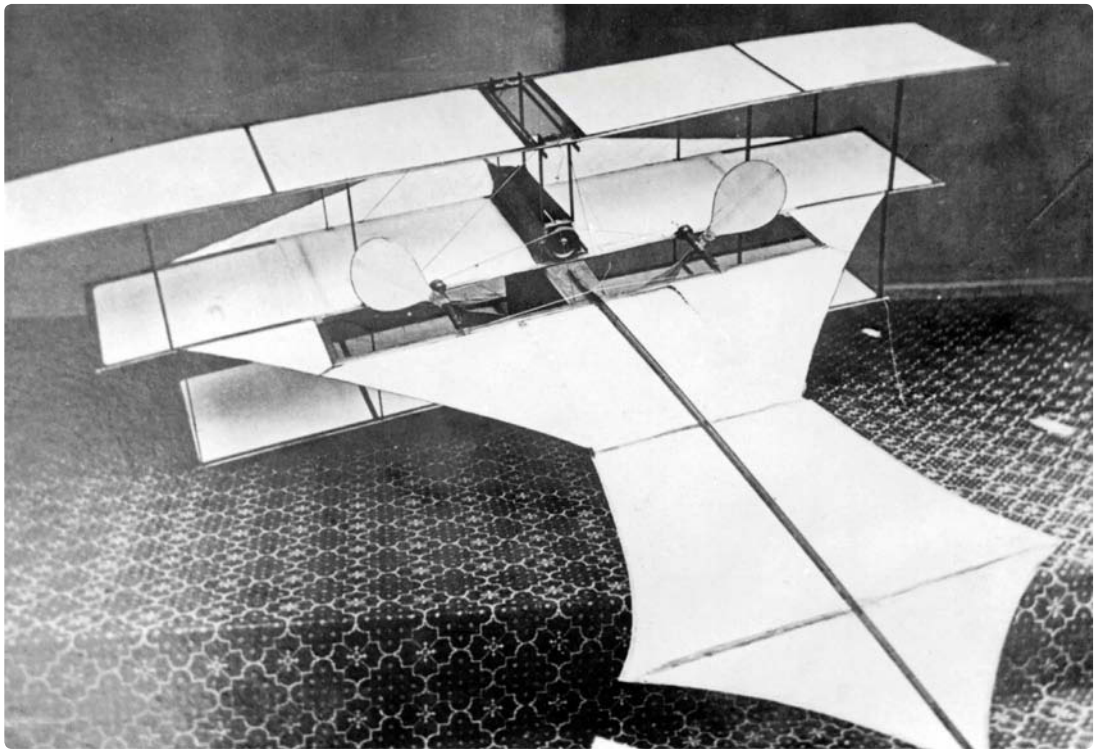
Although Wednesday July 1 was fixed as the day for the adjudicators to see the models work, the *Illustrated Times* reported that "little was done, as some of the exhibitors were absent and others have not completely finished their machines". On this day the Prince and Princess of Wales and Prince Alfred, and several of the Princesses with their train and attendants, visited the Exhibition. The Prince was so impressed with Stringfellow's exhibits that he sent the Duke of Sutherland to bring Stringfellow to the Royal box.

PROOF OF THE PUDDINGS

At 0600hr on July 3, with Stringfellow present, Spencer, wearing his tail and wings, was suspended by a long rope in the transept of the Crystal Palace. He found the fastenings of his apparatus "rather imperfect", the tight wickerwork "corset" of the tail causing pain and obstructing his movements, so that he was "unable to satisfy the curiosity of the public". Nonetheless, he said that the downstroke "had great effect" and that he was raised when he moved his arms. He believed he should practise every morning, and hoped that he would be able to complete his apparatus in two or three weeks. He claimed that while running down a little hill near Potter's Bar the "power of the wings" had enabled him to jump 15–20ft (4·5–6m), and that in the week before last he had covered 120–130ft (36·5–40m). He found that "when he made a jump it was quite possible to fly".

The star attraction, however, was John Stringfellow's triplane, built especially for the exhibition. "Remarkable for the elegance and neatness of its construction", it was powered by a ⅓ h.p. steam engine burning methylated spirits and driving twin 21in (53cm)-diameter pusher propellers via a belt drive at 600 r.p.m. Its wings had a "frontage" (the sum of the spans) of 21ft (6·4m) and an area of 28ft² (2·6m²), and it weighed 12lb (5·4kg). Suspended from an apparatus running on grooved wheels along a wire stretched across the transept of the Crystal Palace, it was demonstrated twice each day. It was said to be "the first experiment adopting the proposed system of superposed aeroplanes [wings] to a steam flying machine", and several witnesses attested that "after a certain velocity had been attained, the machine left the support of the wire and rose up", and that "on one occasion the wire broke just after the start, but the buoyant power of the planes caused so light a descent that that no damage occurred".

The *Morning Star, Standard* and *Observer* newspapers reported that the Aerial Carriage showed a tendency to ascend, evidenced by the fact that the line on which it was suspended



PHILIP JARRETT COLLECTION

ABOVE ***Stringfellow's triplane as it was displayed at the Crystal Palace in 1868. This machine survives, albeit not entirely true to its original form, having been bought from Stringfellow's son Frederick by Samuel Langley for the Smithsonian Institution. Its engine and boiler are in the Science Museum, London.***

was raised as much as "several feet". Although unrestrained flights were forbidden by the authorities owing to the risk of fire, a free flight was essayed in the basement after the exhibition, with Brearey helping to stretch out a canvas with which to break the model's fall once it was liberated. In 1883 Brearey recalled: "When freed, it descended an incline with apparent lightness, until it caught the canvas; but the impression conveyed to us was that had there been sufficient fall, it would have recovered itself".

Another machine that might have been capable of rising aloft, Ponton d'Amécourt's helicopter, was not demonstrated. Its aluminium engine, intended to work at a pressure of 150lb/in² (10·5kg/cm²), was under the charge of Villeneuve, who believed it had a good chance of winning the engine prize, but as "someone had forgotten to bring the pressure gauge" and a suitable replacement could not be found, it was deemed too dangerous to operate the engine.

The other light steam engine demonstrated was that submitted by Camille Vert, which weighed less than 2lb (0·9kg). Unfortunately it was "too small to enable any accurate test to be applied for ascertaining its power", but "seemed to keep up steam well, as noticed in the repeated demonstrations in propelling the model balloon in various directions within the Crystal Palace".

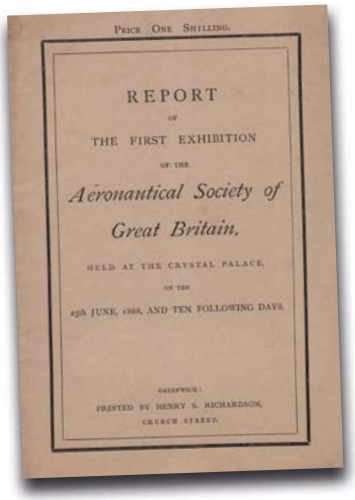
On the third day of the exhibition Delamarne's great balloon, which had a diameter of nearly 150ft (45m) and a car accommodating 14 passengers, met with an accident. Although the aeronaut had led the Society to believe that his balloon was filled with coal gas or hydrogen, it turned out to be a primitive hot-air "fire balloon" filled with vapour supplied from some 18 tins filled with liquid benzine. A box containing the petroleum was carelessly placed, unsecured, on top of the car, and when the balloon made some movements just before starting the box was tilted over and the fuel ignited, causing a sudden blaze that destroyed the balloon. Mercifully no-one was injured. It was subsequently pointed out that, had the Society been correctly informed of the balloon's type, it would not have been deemed acceptable.

AWARDING THE PRIZES

The numerous drawings and diagrams were said to form "a very creditable addition to the Exhibition", the majority being "well executed by persons evidently skilled in mechanical drawing". However, as most depicted ideas "not yet carried into practice" it was "difficult to offer any remarks without entering upon opinions and criticisms, which the Society . . . carefully endeavours to avoid, in the absence of tangible experiments which it is so earnestly desirous of encouraging".

PHILIP JARRETT COLLECTION x 2

LEFT ***George John Douglas Campbell, the 8th Duke of Argyll, was a founding member of the Aeronautical Society of Great Britain in 1866 and was its serving President at the time of the Exhibition, at which he was also an exhibitor, displaying a large clockwork ornithopter model.***


PRICE ONE SHILLING.

REPORT
OF
THE FIRST EXHIBITION
OF THE
Aeronautical Society of Great Britain,
HELD AT THE CRYSTAL PALACE,
ON THE
25th JUNE, 1868, AND TEN FOLLOWING DAYS.

GREENWICH:
PRINTED BY HENRY S. RICHARDSON,
CHURCH STREET.

LEFT ***The cover of the ASGB's report of its 1868 Exhibition at the Crystal Palace. By the time of the Exhibition the ASGB had more than 100 members and afterwards continued its invaluable work promoting the aeronautical cause. In 1918 the organisation received its royal charter, becoming the Royal Aeronautical Society (RAeS).***

It had been intended to demonstrate the various kites on the site, but this was dependent on the wind, and during the whole time of the exhibition there was no wind to permit any of them to be flown and tested.

During the period of the Exhibition the ASGB held three evening meetings at the Society of Arts, on June 29 and July 1 and 3, at which papers were read and discussed, and various aeronautical matters debated. At a Council meeting at the Crystal Palace on July 4 it was resolved that the thanks of the Council be conveyed to Dr Hureau de Villeneuve for his attendance on behalf of the French Society and through him to the French exhibitors.

At an ASGB Council Meeting on July 20, after considering the three qualifying entries for the £100 prize for the lightest engine, the jurors awarded it to Stringfellow's 1 h.p. steam engine. The Shipwrecked Mariners' Society's £50 prize was awarded to Mr John Banting Rogers for his Patent Projectile Anchor and Block for launching lifeboats in rough weather.

MIXED REVIEWS

Opinions as to the overall success of the Exhibition were mixed. It had been a financial failure, and the guarantors were called upon to make up the deficiency of between £40 and £50. The *Daily News* complained that the models and objects were not sufficiently well arranged to enable visitors to gain a clear idea of their value or significance, whereas *Mechanics Magazine* reported that: "Whatever doubt may have been felt as to the possibility of forming anything like an attractive aeronautical exhibition in London is certainly more than dissipated by the present show. In this respect, it is a decided success".

In France, W.M. Fonvielle wrote in *La Liberté*:

"I have looked in vain for any movement in these renowned machines which ought to enable us to fly like the eagle or at least compete with the vulture. I have only seen a very small number of unorganised objects which have never left the ground and are now sentenced to complete rest."

In *L'Aéronaute*, Villeneuve reported: "The English papers are much better than ours as regards hoaxes, puffs and claims. The fairy tales put out about the Aeronautical Exhibition reached colossal proportions".

In its report on the opening of the Exhibition, *Mechanics Magazine* had stated: "There is a general expectation that the Exhibition will be repeated next year, upon a much grander scale than the present: this idea is warranted by the great encouragement the Society has received in its first attempt". However, in its own report on the Exhibition the ASGB said: "With respect to the proposed Exhibition for 1869, much must depend upon the amount of support tendered to Guarantee expenses and prizes . . . but they cannot enter upon another, and probably more extensive one, unless they are supported by a Guarantee Fund". In the end, plans for a bigger exhibition were set aside. The minutes for a Council meeting on January 7 that year report that "the subject of an Exhibition for 1869 was discussed, but it was thought better to abandon the idea for the present".

THE ROME–TOKYO EXPRESS

THE REGIA AERONAUTICA'S 1942 ROUTE-PROVING FLIGHT TO JAPAN

In the first article of a new three-part series detailing the Axis Powers' wartime use of air transport to facilitate strategically vital face-to-face VIP meetings — or lack thereof — **RAY FLUDE** joins forces with Italian aviation historian **GREGORY ALEGI** to describe Italy's extremely risky — politically and physically — route-proving flight to Tokyo in 1942

IN DECEMBER 1941 the war that had engulfed Europe for the previous two years spread to become a global conflict, and both sides went through similar processes to develop their alliances to cope with this. The British and Americans met at the *Arcadia* Conference in Washington DC and the Germans hosted the signing of a military agreement with Japan and Italy in Berlin. Both sides made formal agreements outlining their aims and how they would work together to achieve them, and both created or reviewed the infrastructures they could use to manage their collaborations. Both tried to improve their communications and both looked at sharing resources, technology and weapons. Both considered joint operations.

There was, however, a huge difference in the degree to which the two sides followed through on the statements they made. The Allies knew they needed to work together. Britain and the USSR had experienced the power of Germany's forces at first hand and been overcome by them in western Europe and on the Eastern Front, and the Americans and British had recently experienced defeat at the hands of the Japanese. They knew that victory over Germany, Italy, and now Japan, would require the combined power of all three major Allies working together, as well as long-term joint planning and action. There was a strong mutual self-interest at play which would hold their alliance together until victory was achieved.

In contrast, the Axis powers appeared to be well on the way to achieving victory already without the need for any collaboration or joint action. Each had expected to fight a series of short victorious wars and then negotiate from a position of strength to hold their territorial gains. Japan had put forward the first draft of a military agreement in December 1941 in a bid to establish closer ties between the Axis powers on military matters, but the document signed on January 18, 1942, was almost entirely about continuing to fight separate wars within strict lines of demarcation and without any meaningful collaboration.

Both sides made statements about air routes. An urgent priority for the Allied Combined Chiefs of Staff, which had been formed to manage joint strategy as an outcome of *Arcadia*, was to provide for the security of the principal sea routes and the seven main air routes over which men and supplies could be moved to the battlefronts.[1] The Axis Military Agreement also contained a clause about "co-operating to establish a military air link between Japan, Germany and Italy". But by the time the agreement was signed this commitment had been watered down, the Germans inserting "in so far as technical considerations allow".

DIFFERING PERCEPTIONS

One of the most significant differences between the Allied and Axis alliances was the increasing interconnectedness of the Allies' activity, and the quantum leap they made in the creation of a globe-spanning web of air transport links which could support this approach. The successful co-ordination of strategy and operations and the successful sharing of resources, technology and weapons were all made easier because air

VIA GREGORY ALEGI

ABOVE ***This beautifully evocative illustration, showing the Japanese public in traditional dress greeting the Italian trimotor as it sweeps over Tokyo on its arrival from Rome in July 1942 (with a somewhat "larger than life" Mt Fuji in the distance), was painted by renowned Fascist poster artist Gino Boccasile for an Alfa Romeo advertisement.***

PHILIP JARRETT COLLECTION

One of the contenders considered for the Rome—Tokyo flight was the Fiat G.12, the civil prototype of which had made its first flight on October 14, 1940. The type was subsequently developed as a military transport, the G.12T, as seen here, being introduced in June 1941. A long-range variant could not be made available in time for the Tokyo flight, however.

transport could bring high-level decision-makers together, face to face, to overcome barriers and resolve differences. This was a highly significant factor in helping the Allies to win the war.

The Allies faced many of the same problems that prevented the Axis powers from collaborating, but were able to negotiate, make compromises and defuse disagreements because they could meet using their air transport assets. The Axis powers did not really believe in the need to collaborate, and thus lacked the urgency and drive to create the air transport links that would have made co-operation possible. For example, on June 27, 1942, commenting on the recent meeting between Prime Minister Churchill and President Roosevelt in Washington DC, Hitler showed his lack of understanding of the possibilities of joint action when he said: "When two people are in general agreement decisions are swiftly taken. My own conversations with the *Duce* [Mussolini] have never lasted more than an hour and a half . . . To harness to a common purpose a coalition composed of Great Britain, the USA, Russia and China demands little short of a miracle".[2]

Nevertheless, all three of the Axis powers had air-link projects under way by the summer of 1942, although none was given a high priority. None of the Axis partners had a bomber aircraft with strategic range which they could use as the basis for these flights in the way that the Allies had used the Consolidated Liberator in the early part of the war, because all three of the former saw the main purpose of air power as support for ground troops. When considering very-long-range flights they had to look at civilian transports or aircraft either designed or converted to set records.

In Germany air-link plans became locked in endless internal negotiations between the leaders of Lufthansa, elements within the Luftwaffe and Goering and Foreign Minister von Ribbentrop, all encouraged by General Hiroshi Oshima, the Japanese Ambassador in Berlin. There were interminable arguments about priorities for the use of the few long-range aircraft available. All these disagreements were magnified by personal disputes within the hierarchy and the fact that there was no continuity in the decision-making process other than by gaining Hitler's support, which could not be relied on for long.

The Japanese were keen to get a high-level delegation to Berlin to bolster the voice of Ambassador Oshima in negotiations with the German leadership, but Japan's own project had run into technical problems and would not be ready to undertake a flight until July 1943. One of the major difficulties which arose in the planning of flights between Europe and the Far East was the fact that Japan and the Soviet Union had signed a Neutrality Pact on April 13, 1941. The maintenance of this agreement was a key continuing strand in Japanese foreign policy, from its signing until its final breach by the Soviets in 1945 in the last weeks of the war. There were mutual advantages for the Soviet Union and Japan, in that this freed both from the threat of fighting a war on two fronts; but it seriously affected the air routes which could be used. The Japanese could not countenance any route from Europe which infringed Soviet airspace.

THE ITALIANS MAKE THE FIRST MOVE

Italy was the first to move on its air transport project and, like the German project, the proposal originated with an airline. Formed in 1939 for transatlantic services to Latin America, *Linee Aeree Transcontinentali Italiane* (LATI) had completed 211 crossings to and from Brazil when, following the Italian declaration of war against the USA on December 24, 1941, Brazil suspended LATI's licence. The following month, the Rio Conference obligated Brazil to break diplomatic relations with Italy. As a result five LATI SIAI-Marchetti SM.75,

In the spring of 1939 SIAI-Marchetti SM.75PD I-TALO, specially modified for long-distance flying, set a new record by covering a remarkable 12,935km (8,037 miles) over a closed circuit, making the type a logical choice for the Rome—Tokyo—Rome flight in 1942. Two SM.75GAs were accordingly taken from a LATI order and modified to "RT" standard.

PHILIP JARRETT COLLECTION

SM.82 and SM.83 trimotors were impounded in Rio de Janeiro, Recife and Natal.

While its crews continued to fly military routes in the Mediterranean, LATI started exploring ways to maintain its long-distance expertise, with a view to resuming commercial operations after the war. Within a month, *Comandante* Ernesto Coop proposed linking Rome to Tokyo, identifying a single northern and two southern routes.[3] A fortnightly service would require four aircraft and suitably provisioned stops at Odessa in southern Ukraine and Pao Tow (now Bautou) in Inner Mongolia.

By early February 1942 LATI had put its plan directly to Mussolini, claiming that his son Bruno had contemplated the idea before his death in August 1941 in a Piaggio P.108B bomber. On March 1, 1942, the *Regia Aeronautica* (Italian Air Force) Deputy Chief of Staff, *Generale di Squadra Aerea* Giuseppe Santoro, chaired a high-level meeting on the subject. The length of the route — 10,000km (6,200 miles), of which two-thirds ran over enemy-held territory — limited the choice of aircraft and crews. The shortlist of experienced potential captains was headed by Amedeo Paradisi and included Antonio Moscatelli, Giorgio Rossi and Enrico Cigerza.[4]

Aircraft choice was also limited, not only by the nature of the route, but also by the agreements made with Japan to make the flight before the end of June 1942. When LATI had evaluated the Fiat G.12 in the summer of 1941, it had valued its high cruising altitude, stability and all-metal construction, but had also pointed out the need to fit navigation, communication and de-icing equipment. The first Alfa Romeo 126-powered G.12 *Grande Autonomia* (GA — long range) for LATI (c/n 14, registered I-ALIH and later I-FAUN) made its maiden flight on April 16, 1942. The RT variant, intended specifically for the Rome—Tokyo route, would need Alfa Romeo 128 engines, increased fuel capacity, a strengthened undercarriage and a stretched fuselage to maintain the aircraft's centre of gravity. These changes were incorporated directly into G.12 c/n 23 (serial MM.62177), which only became available in August 1942. Further changes led to the RTbis configuration, two of which (MM.61278 and MM.60694) took until June 1943 to complete.

FINDING AN ALTERNATIVE

The focus therefore had to shift to aircraft which were readily available. In late February Capt Max Peroli suggested the sleek Piaggio P.23R long-distance trimotor, which had lain dormant after setting some minor records in 1939. Whatever its merits, this proposal became moot when the sole prototype was lost after groundlooping at Villanova d'Albenga on May 23, 1942.

The best remaining option was the SM.75, which formed the basis for the rugged SM.82 military transport. The specially modified SM.75 *Primato Distanza* (PD — distance record), confusingly also referred to as an SM.82 for commercial and propaganda reasons, had set a distance record by flying some 12,935km (8,037miles) in 57hr over a closed circuit during July 30–August 1, 1939, providing useful data on engine settings and fuel consumption. Fortunately, the long-range SM.75GA was already in production, and MM.60537, the first of eight already under construction (two for the Regia Aeronautica and three each for LATI and Ala Littoria), would be ready for delivery on March 10, 1942.

Paradisi and the SM.75GA were therefore the obvious choice. The aircraft's three Alfa Romeo 128 engines were rated at a combined 3,150 h.p. at take-off boost and 2,640 h.p. at maximum continuous power. Armando Palanca, LATI's brilliant chief powerplant engineer, had calculated payload/distance combinations for the aircraft, ranging from 3,300kg (7,280lb) over

5,000km (3,100 miles) to no payload over 9,870km (6,130 miles). The aircraft was lost, however, and Paradisi badly injured on a ferry flight after a trial long-distance expedition to Eritrea in May 1942 (see panel at right).

In mid-May 1942 former airline pilot *Tenente colonnello* Antonio Moscatelli, then in charge of setting up the 41° Stormo nightfighter wing, took over the lead in planning the Tokyo flight. He enlisted his old LATI crew, with *Maggiore* Antonio Curto as copilot and *Maresciallos* Ernesto Leone as flight engineer and Sacco as radio operator (later replaced by *Sottotenente* Ernesto Mazzotti). A third pilot was added, *Capitano* Publio Magini, widely regarded as one of Italy's best navigators.

The SM.75GAs MM.60539 and MM.60543 were withdrawn from the LATI order and brought up to RT standard, incorporating SIAI S.53 Idrovaria propellers, de-icing boots, individual heated flying suits and a Plath sextant. The aircraft were stripped of all excess weight to increase range; even the cockpit seats were exchanged for metal frames covered with canvas to save weight, and the passenger cabin was filled with extra fuel tanks.[5] Clearly this would not be possible in scheduled service, but the first flights were seen as propaganda-rich route-proving flights.

Security seems to have been somewhat lax, however, and soon the plan for an Italian flight to Japan became widely known. Moscatelli and Curto attempted to counter this by conspicuously requesting maps and passports for South America.[6] By March 1942 an internal official announcement had been made.[7]

THE PLAN IS SET

The planned flight to Japan would have major significance for Japanese/Italian relations, and the Japanese Ambassador to Rome, Zenbei Horikiri, met with Italy's Foreign Minister, Count Ciano, to clear flight arrangements and confirm that the Japanese government agreed with the plans. Horikiri brought Circular No 974, entitled *Essential features for establishing a Japan—Germany and Japan—Italy air service*, issued on June 3, 1942. This was the definitive statement of the Japanese view on preconditions for flights from Europe. The essential factors identified were as follows:

"Concerning the route, Japan desires it to follow a line connecting Pao Tow, Kabul [in Afghanistan] and Rhodes [Greece] or a course to southward of this line. Airfields have been designated as Pao Tow, Rangoon [Burma] and Tokyo; seadromes — Dairen [now Dalian in China], Rangoon [and] one in Japan (still undecided). This air service will be kept a strict secret."[8]

It is clear from this that the Japanese were not expecting any Italian flight to cross Soviet territory and that they were expecting the flight to be kept highly secret. The Japanese were taking a similar consistent line in their parallel negotiations with the Germans. But Moscatelli and Magini had identified an outward route via Zaporozhye, inside Axis lines in south-eastern Ukraine, and on to Pao Tow. The return flight, taking a more southerly route via Hong Kong, Akyab in Burma (now Sittwe, Myanmar) and Rhodes would be more closely aligned with Japanese expectations. For the Russian leg of the flight the Italians assessed the risks as enemy radar, searchlights and radio transmissions (radio silence could be maintained and weather reports encoded).

On June 12, 1942, Moscatelli and his crew made a test return flight to Seville in Spain and Lisbon in Portugal, and on June 17 *Tenente di vascello* Roberto De Leonardis and Capt Ernesto Rossi were despatched from Tokyo to Pao Tow in order to prepare for the aircraft's arrival. Fuel samples were sent from Zaporozhye to Rome for testing.

As departure drew closer, new problems arose.

TEST FLIGHT TO ERITREA

ON MARCH 15, 1942, Amedeo Paradisi, the newly selected captain for the Rome—Tokyo flight, began training with his crew, comprising copilot Publio Magini, radio operator *Sottotenente* Ezio Vaschetto and flight engineer *Maresciallo* Vittorio Trovi. Two days later the crew collected SIAI-Marchetti S.75GA trimotor serial MM.60537. Their training was interrupted by a propaganda flight to the recently lost Italian colony in Eritrea in East Africa.

The flight, ostensibly a sixth anniversary celebration of Italy's second invasion of Ethiopia during 1935–36, which established Italian East Africa, started from Guidonia airfield in Rome on the morning of May 7. After some 5hr, the trimotor landed at Benghazi in Libya, and, during the late afternoon of May 8, took off for Asmara, the British-controlled Eritrean capital, flying at 300m (1,000ft) over British-held Egypt and Sudan.

After 10hr aloft, the crew dropped leaflets over the city and headed back, despite severe weather conditions, including sandstorms. Near Benghazi, Paradisi decided to continue on, first to Taranto in southern Italy and then to Rome, landing at Ciampino at 2135hr local time after 28hr of flying.

The success of the flight was seen as a good omen for the prospective Tokyo flight. However, on May 11, 1942, Paradisi took off on the short journey back to Guidonia and the aircraft crashed minutes after take-off when all three engines failed simultaneously owing to fouled plugs. Paradisi was trapped in the wreckage.

Despite minor injuries Magini, Vaschetto and Trovi succeeded in extricating him. But Paradisi's injuries were serious enough to require the amputation of a leg, with Mussolini visting the crew in hospital. This was the end of MM.60537 and of Paradisi's hopes of flying to Tokyo. **RF/GA**

VIA GREGORY ALEGI

ABOVE ***One of Italy's most distinguished aviators, Antonio Moscatelli joined the Regia Aeronautica in 1928, seeing combat as a bomber pilot in the Spanish Civil War in 1936. After a period instructing in Brazil, he returned to Italy to join LATI, but rejoined the air force on Italy's entry into the war in June 1940. He later underwent training on the Junkers Ju 87 Stuka.***

On June 16 the Italians offered Indian nationalist leader Subhas Chandra Bose (who was negotiating with the Axis forces to rid India of British rule) a seat on the flight to the Far East. He was told there was an "obvious level of risk" and that he would have to travel alone and without luggage, as the extra fuel tanks needed to give the aircraft sufficient range took up all the available cabin space. Bose accepted the offer with enthusiasm the next day[9] and the ambassadors in Berlin and Tokyo were then asked to gain the approval of each other's governments for Bose's journey.[10] But, in another example of the lack of mutual understanding between the Axis powers, they could not agree about Bose travelling on the flight. The Germans distrusted the competence of the Italian airmen and the capabilities of the aircraft and proposed that Bose should travel in a German submarine instead. For their part, the Japanese were still unsure about relying on Bose as their figurehead for Indian resistance movements and were unwilling to receive him.

As preparations continued, the Italians were instructed not to carry on board any messages or official gifts which might give away their point of origin or destination in the event of an emergency.[11] On June 27 it was confirmed that Bose would not be travelling on the SM.75, and on the 28th the Italian air attaché in Tokyo, Riccardo Federici, relayed Japanese reports of Russian jamming and false broadcasts on various frequencies on the Rome—Tokyo route.[12]

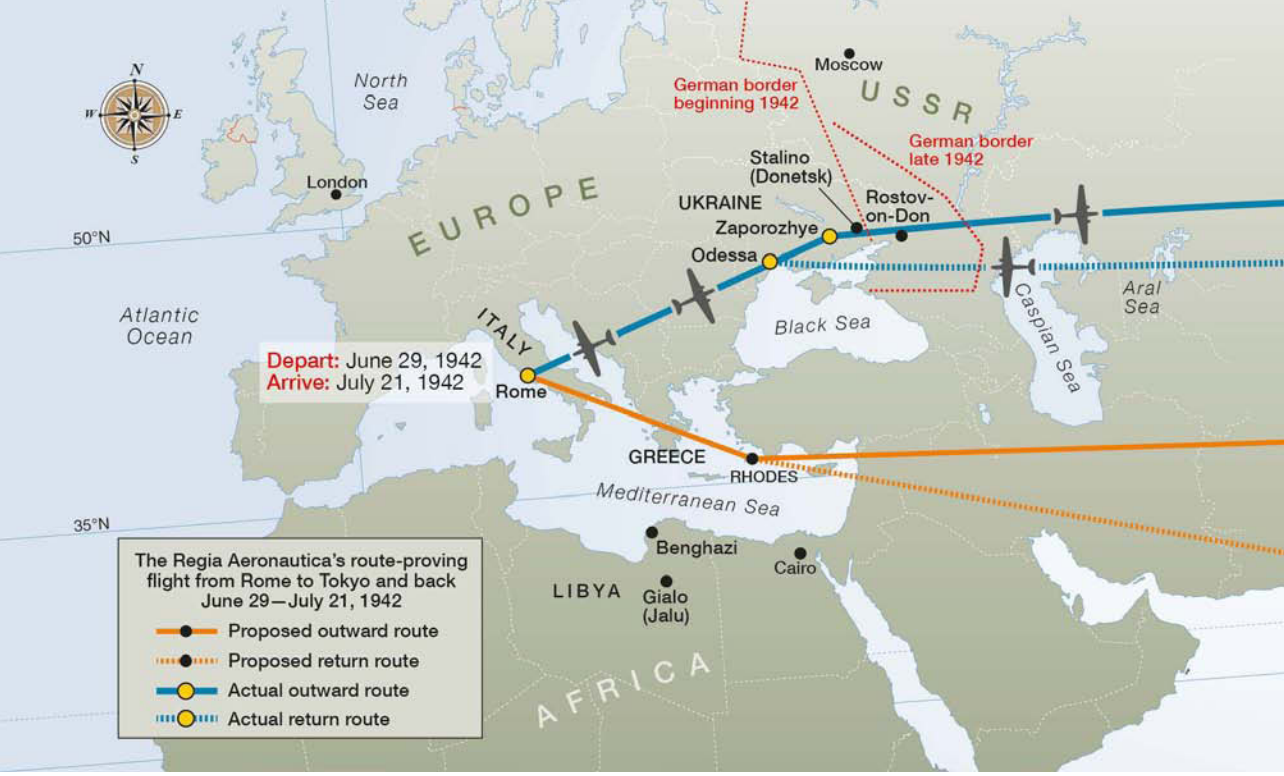
ANDIAMO!

Moscatelli had already made up his mind to go. At dawn on June 29, 1942, Curto picked up Moscatelli and they drove to Guidonia airfield in Rome, carrying two sub-machine-guns borrowed from the *Polizia dell'Africa Italiana* (Italian African Police) for self-defence. The SM.75RT, serial MM.60539, was unarmed. The crew boarded, including Palanca to monitor engine performance and LATI chief radio officer Marcello Tommasi, both of whom would remain aboard as far as Zaporozhye.[13] The trimotor took off without difficulty and 9hr later reached Zaporozhye. The crew refuelled, cleaned the spark plugs and waited for weather reports. On the evening of June 30 the heavily-laden SM.75 took off and crossed the front line close to Rostov-on-Don at low level, gradually climbing to 4,000m (13,100ft).

For 160km (100 miles), as the aircraft slowly climbed, it was tracked by searchlights and fired at by anti-aircraft artillery. The flight continued north of the Caspian Sea, Aral Sea and Lake Balkhash in Kazakhstan. Magini could take star-shots with his sextant in less than a minute, and he would later complain that even large mountain chains were misplaced or missing from the maps he brought along. As dawn broke, the route took them across uncharted areas of the Gobi desert.

Finally, at 2345hr local time, after 21hr 14min airborne, the SM.75 touched down at Pao Tow, where it was met by De Leonardis and Rossi. The halt at Pao Tow was required by the Japanese for security purposes. Following the success of USAAF Lt-Col James Doolittle's B-25 raid on Tokyo in April 1942, Japan's air defences had become particularly vigilant. *Hinomaru* (rising sun) insignia were painted on the SM.75's fuselage and wings to identify the aircraft for the onward flight to Tokyo, and, to ensure it followed a safe corridor, a Japanese pilot was taken on board, with Rossi acting as interpreter.

On the morning of July 3 the SM.75 took off from Pao Tow, following a strictly controlled route over Peking, Dairen, Seoul in Korea and Yonago on the northern coast of Japan's main island, Honshu, before landing in the early evening at Tachikawa airfield, west of Tokyo.[14] The longest leg on the



RIGHT ***The August 10, 1942, issue of Italian magazine*** **Ali di guerra** ***(Wings of War) featured a "wraparound" cover with a map purporting to show the weather conditions during*** **Il lungo volo** ***— the long flight — although the route flown has clearly been left deliberately vague, with arrows pointing out of Italy and into Japan — and no further information.***

BELOW ***The SM.75 at Tokyo with its crew and Japanese officials posing for a publicity photograph, despite Japan's reluctance to draw too much attention to the flight, for fear of alerting the Soviets to its route.***

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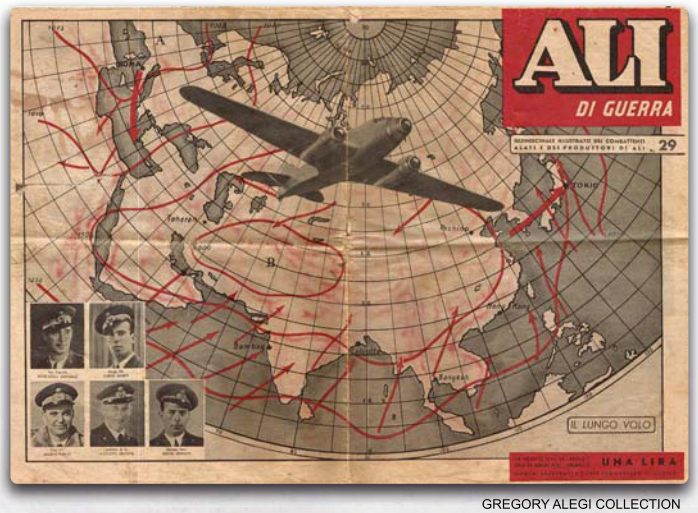

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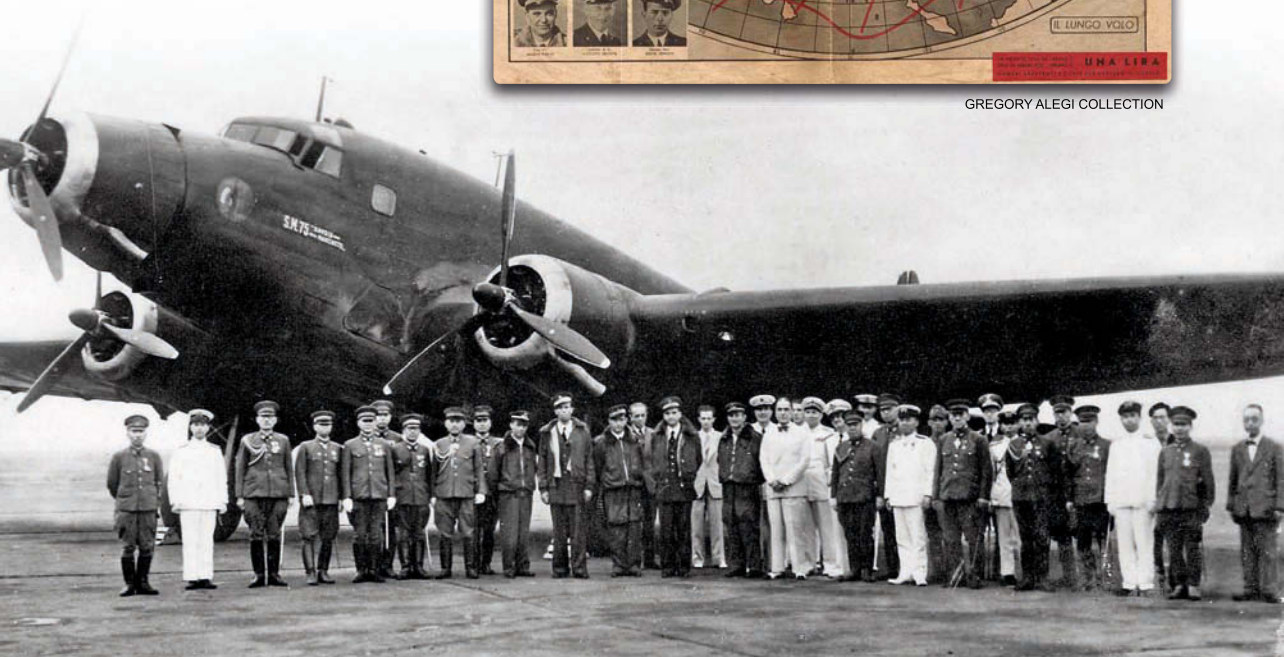

MAP BY MAGGIE NELSON

outward journey, from Zaporozhye to Pao Tow, covered some 6,435km (4,000 miles) and the total length of the flight was 10,130km (6,300 miles).

12 DAYS IN TOKYO

The Italian crew was well received, but planning the return flight brought up the same issues. The idea of using the southern route via Formosa (now Taiwan) and the Andaman Islands in the Bay of Bengal was abandoned on July 8, because it would have meant a long flight over British-held India.[15] On July 10 the Japanese requested that one of their pilots join the return flight, but they eventually backed down and on the 15th, it was decided to leave official gifts from Japan, including ceremonial swords for Mussolini, Gen Rino Corso Fougier (commander of the Regia Aeronatica) and Moscatelli, at the Tokyo embassy, again to conceal the flight's origin.[16] The same day, Ernst Woermann, the German Foreign Office official with a watching brief on the Italy—Japan flight project for Foreign Minister von Ribbentrop, noted the news from Tokyo:

"The Italian East-Asia aircraft, the Savoia 75, flew on the second of the month to the Chinese airfield at Pao Tow and, according to the German Ambassador, landed in Tokyo on the evening of July 3 in spite of unfavourable weather. The leader of the flight is long-distance flyer and frequent companion of Bruno Mussolini, Capt Moscatelli. By sending him, the Ambassador notes, the Italian Air Force has raised the interest in flights amongst the Japanese leadership.

"At the reception in the Italian Embassy, the [Japanese] Vice-Chief of the Admiralty and Navy Minister were present, and in his speech the Navy Minister spoke of the historic importance of the first air service flight of the war with powerful strategic implications. The [German] Air Attaché in Tokyo has told me recently that the Japanese wish the flight to be kept a close secret."[17]

The Air Attaché, von Gronau, was clearly aware that the Japanese wished the flight to be kept secret, but while the aircraft was on the ground in Tokyo, Italian diplomats tried without success to persuade the Japanese to allow publicity for propaganda purposes. Magini would later recall how the crew had been warned about the potential problems with the route they had taken, and he knew that he had to keep up the pretence that the flight had come over a southern route, despite growing Japanese unease.[18] Some Japanese officials became increasingly sceptical about the story that the Italians had flown over Afghanistan and India, and, while the crew members were still in Japan, their hosts' concerns were already being expressed. The Japanese were particularly anxious to keep news of the flight from the Soviet Ambassador in Tokyo.[19]

Much to the displeasure of the Italian crew, it was decided that the SM.75 would return via Pao Tow. The combination of high altitude (1,100m/3,600ft), high temperatures and a high loaded weight made take-off from Pao Tow's relatively short runway an unpleasant prospect.

THE RETURN

After the Italian crew had spent 12 days in Japan, relations were becoming tense and the departure from Tokyo was rushed. On July 16 the SM.75

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ABOVE ***The SM.75RT is refuelled at Tokyo, probably on the morning of its departure back to Italy on July 16. The trimotor was painted*** **Verde Oliva Scuro** ***(Dark Olive Green) overall and*** **hinomaru** ***(rising sun) insignia were applied on the fuselage and wings for the Pao Tow—Tokyo—Pao Tow sectors.***

RIGHT ***Antonio Moscatelli (third from right) and members of his crew discuss the return journey with Japanese officials in Tokyo. A more southerly route via Formosa and the Bay of Bengal was rejected.***

returned to Pao Tow, where the Japanese markings were removed. After two days at the Mongolian airfield, Moscatelli and Leone paced the runway, worrying whether it would be long enough for a take-off, particularly with the prevailing light tailwind. To save every ounce of weight, the two sub-machine-guns would be left behind.

Leone boosted the Alfas and Moscatelli pulled the aircraft up at the very last moment; the SM.75 disappeared into a valley, slowly gaining enough speed to make the controls effective. The trimotor clawed for altitude, taking an agonising 75min to reach 4,000m (13,100ft). Because of heavy fighting around Zaporozhye, the return flight was bound for Odessa instead. Moscatelli took a break to rest, leaving Curto in command.[20] He was soon called back, however, with the SM.75 struggling to negotiate a thunderstorm so fierce that Curto and Magini had to revert to manual control.

Five hours into the flight the autopilot failed and Moscatelli established 2hr shifts at the controls. Magini found that the navigation was much more difficult, with unbroken cloud masking the stars. Fearing later Soviet fighter attacks, Moscatelli again tried to rest to be better prepared, only to be again interrupted by Leone with news that the oxygen system had failed. By Magini's reckoning the trimotor was on route, but behind schedule.

Two hours from Zaporozhye, the radio failed. Unable to contact the stations at either Stalino (now Donetsk in Ukraine) or Zaporozhye, Moscatelli decided to circle until dawn. Eventually Magini matched the map to a bend in a river 48km (30 miles) from Odessa where, after 38hr in the air, the SM.75 touched down at 0210hr GMT on July 21. Moscatelli, exhausted, went to sleep under the wing. Two hours later he was woken with an order to hurry to Rome. When the trimotor landed at Guidonia at 1655hr local time, the crew was greeted by Mussolini, Fougier and a gaggle of Italian, German and Japanese officers.

With the flying taken care of, the tension between Japan's need for secrecy and the Italians' desire to publicise their success resurfaced. Various strategies were considered; the Italians toyed with the idea of leaking wildly exaggerated stories to the Portuguese and Swiss press to justify publishing "corrections". However, it was decided — before the ruse could be played out — to be bold, and information about the flight was widely distributed to the Italian press. On July 26, 1942, the arrival of the flight in Rome was the subject of an article in *Il Popolo d'Italia*, the Fascist Party newspaper, in open defiance of the messages from Japan about the need for secrecy and Japan's rejection of the Italians' request to

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make propaganda capital from the exploit.[21] Major coverage soon followed in all the main newspapers, followed by periodicals including *La Domenica del Corriere* (its issue of August 2, 1942, had a full-colour cover painting by famed illustrator Achille Beltrame) and the aviation fortnightly *Ali di guerra*.

Il Popolo d'Italia's headline ran: "26,000km flight: Rome to Tokyo and back. A salute from Italy under arms sent by our aircraft to the Japanese people". The newspapers printed photographs of the SM.75 and its landing in Rome, as well as a picture of the crew with Japanese officers in Tokyo. On one front page the crew is posed with the aircraft on the ground in Rome, and the story tells of the flight to and from Japan and how it was welcomed by Il Duce and Admiral Abe, the head of the Japanese military mission in Rome. At the end of July SIAI-Marchetti took out a stylish advert in *Il Popolo d'Italia*, displaying its pride in the use of its aircraft on the Rome—Tokyo flight.

The point was made emphatically that the flight passed over hostile territory, and, although this obviously added greatly to its propaganda value by underlining the bravery of the Italian airmen, it was obvious that the hostile territory was the Soviet Union. This shows a remarkable level of contempt — or at best disregard — for the Italians' ally's concerns. Magini described how he and the other crew members were at a reception in the Japanese Embassy in Rome when the newspapers published the story implying that the Italian aircraft had crossed Soviet airspace. He and his colleagues were asked to leave immediately.[22]

ABOVE ***This poor-quality but rare photograph shows the Italian crew saying its goodbyes at Tokyo before departing Tachikawa airfield on July 16, 1942, for the return to Tokyo. Note the rather crude*** **hinomaru** ***applied to the white band on the SM.75's rear fuselage.***

BELOW ***With the nose engine shut down to minimise wear-and-tear, the SM.75RT taxies in at one of the stops along the route. The location is unknown, but the backdrop appears to be European rather than the more mountainous Japan or Mongolia's Gobi desert.***

POLITICAL FALLOUT

The first formal indication of Japan's displeasure came in a message from Tokyo to Rome on August 2, 1942, in which it was pointed out strongly that if the Soviets protested, the Japanese would have to say that the Italians had not consulted with them over the route of the flight. There should also be no more public announcements from the Italians.[23] This suggests that the Japanese may

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LEFT ***On landing at Guidonia in Rome in the late afternoon of July 21, Moscatelli and his crew were greeted by Benito Mussolini and a host of Italian and Japanese dignitaries. After the war Moscatelli became a reserve military pilot in 1948 and rejoined LATI in 1949. He later occupied a senior position in Brazil with Alitalia and died in 1959.***

BELOW ***The Piaggio P.108C was a transport development of the P.108B, the only four-engined bomber to be used by the Italians during the Second World War. The P.108C was one of LATI's preferred candidates for further Far East flights; but by late 1942, with the Allies making headway in North Africa, it had been decided that these were not a priority.***

have always been aware of the route to be taken, but were willing to accept it as long as it remained secret and did not reach the Soviets.

How far down the hierarchy this collusion went in Japan is not clear, but some people there certainly did believe that the Italian flight had come via Rangoon and would return that way. What is clear is that despite the immediate protest, the Japanese proposed, within the same message, a second Italian flight, in September, although this would have to be over the southern route. The Italians responded by allocating SM.75 MM.60543 to the proposed flight.

Despite concerns about the route taken by the Italian flight over Soviet territory, Japan was still keen to find a way to get its representatives to Berlin and persisted with the Italians in the absence of any serious moves by Germany, and in the face of the continuing delays of its own long-distance project. Planning started for a second flight. Two routes were considered; one via Rhodes — a total of 13,200km (8,200 miles), including a 7,000km (4,350-mile) leg from Rhodes to Rangoon — or another via Gialo (now Jalu) in Libya, a total of 14,100km (8,760 miles).

By early October 1942 the plan was to fly from Benghazi in Libya over Egypt, Arabia, north of Oman and the Straits of Hormuz, over Bombay to Rangoon, where the aircraft would be painted with Japanese markings, and then on to Tokyo with stops at Bangkok in Thailand and Clark Field in the Philippines. The longest leg of the journey, Benghazi to Rangoon, would be 7,725km (4,800 miles) and the whole flight would cover some 14,770km (9,180 miles). The plan was for the first stages of the flight to cross Egypt and India at night to avoid interception. The Italians were wary of switching from the route they had already flown so successfully to the more risky southern route. Also, which aircraft to use was becoming a problem.

The Fiat G.12RT remained a possibility, with its designated navigator Capt Guidantonio Ferrari carefully planning the route.[24] On September 21, 1942, the Regia Aeronautica asked Fiat to increase the G.12's range from 8,000km (5,000 miles) to 9,000km (5,600 miles) to provide a greater safety margin. By October 9 the company had reached the conclusion that rather than modify MM.61277 to the new RTbis standard, it would be easier to complete two new aircraft with the proposed 27 fuel tanks, with a combined total capacity of 13,055lit (2,870 Imp gal). For various reasons, however, these two trimotors (MM.61278 and MM.60694) would not be ready until 1943. If any new flights were to be made, they would have to use the same aircraft Moscatelli had taken to Tokyo in July.[25] This, of course, would mean the second flight would also be just another propaganda exercise, with no practical purpose.

PHILIP JARRETT COLLECTION

WHAT HAPPENED TO BOSE?

ON THE NIGHT of April 26–27, 1943, German U-boat *U-180* undertook a rendezvous with Japanese submarine *I-29* in the Indian Ocean off Madagascar. Subhas Chandra Bose transferred to *I-29* in a rubber dinghy after a 10hr meeting on the surface; in return, two VIP passengers and gold for the Japanese embassy in Berlin were transferred aboard *U-180*.

On May 6 *I-29* carried Bose into Sabang, an island off the northern tip of Sumatra. He went on to work with the Indian National Army, made up of anti-British groups, prisoners of war and deserters from the British Army under Japanese control, which was involved in the unsuccessful Japanese invasion of India in 1944. Bose died in an air crash on Taiwan in August 1945 on a flight to the Soviet Union, where he thought he might find support. **RF**

Although the 24-passenger Fiat G.12 would seem to be a more realistic choice of aircraft for meaningful exchanges between Japan and Europe over the long term, LATI never saw the G.12RT as ideal for the route. Rather, it was looking forward to the availability of the four-engined Piaggio P.108C, which would not make its first flight until July 16, 1942, and, beyond that, to the proposed six-engined P.127, which still only existed on paper. Ultimately, the development of a second RT aircraft was a waste of time and resources that Italy could ill-afford.

Meanwhile, Bose was offered a place on the proposed next flight to Tokyo. Agreement had been reached this time with Germany and Japan and he travelled to Rome in October 1942, ready to fly, again alone and with no baggage. The flight was delayed, however, and postponed into November, and ultimately did not take place.

On November 17, 1942, the Italians abandoned the plan, for a number of reasons. There was a breach of security from an unknown source that was picked up by the British press, and the radio beacon was not ready at Rangoon; there were also suggestions, later reported by Oshima, that the Italians lost impetus after the Allies' Operation *Torch* landings in North Africa in November 1942, and the resulting spread of fighting towards Tunis. As this was the area through which the Italians expected to route the Tokyo flight, the combination of the *Torch* landings and the battle at El Alamein really did close down the opportunity.

The postponement of the second Italian flight for several months coincided with Axis defeats in Tunisia in May 1943 and the Allied invasion of Sicily that July. The focus of attention for the Italians was not on making flights to Japan while the Allies planned the invasion of the Italian mainland. The future development of air links between the Axis powers in Europe and the Far East would now depend on the German and Japanese projects coming to fruition.

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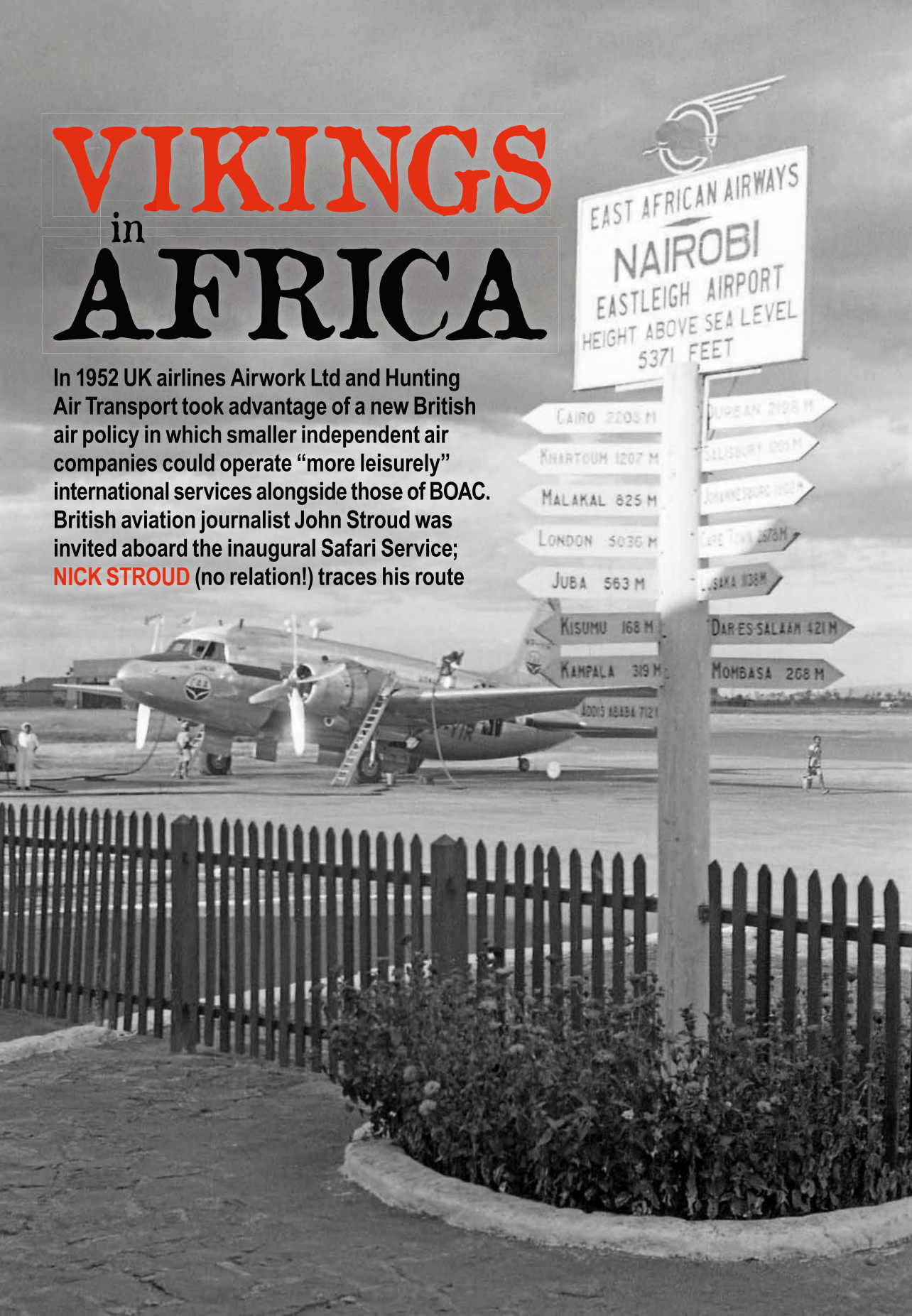
24 Capt Ferrari showed the map to author Alegi in the late 1990s
25 Herde, 2000 op cit

ACKNOWLEDGMENTS *Gregory Alegi would like to thank Laura Gritti Pilotto for her generous assistance in providing access to the Moscatelli family archive*

NEXT TIME *Ray Flude takes a look at Japan's efforts to open an increasingly necessary air link from Tokyo to Berlin with the Tachikawa Ki-77 in the summer of 1943*

VIKINGS in AFRICA

In 1952 UK airlines Airwork Ltd and Hunting Air Transport took advantage of a new British air policy in which smaller independent air companies could operate "more leisurely" international services alongside those of BOAC. British aviation journalist John Stroud was invited aboard the inaugural Safari Service; NICK STROUD (no relation!) traces his route



AFRICA — the wildly exotic "big continent", with its impossibly long rivers, magnificent tumbling waterfalls and terrifying wildlife — first captivated the young John Stroud in the early 1930s, when, as a teenager, he was taken to his local picture house to see *Round Africa with Cobham*, the film of the eponymous aviator's adventures touring East Africa in a Short Singapore flying-boat in 1928. So beguiled by the prospect of seeing such bewitching sights for himself was the budding air travel specialist that he swiftly set about convincing Imperial Airways at Croydon to take him on at the ripe old age of 14; he later recalled how "the Africa route fascinated me, with its stops on the Nile at Wadi Halfa, Khartoum, Kosti, Malakal and Juba, and it was always one of my ambitions to fly along it, though never my good fortune to do so".

Fortune smiled on the intrepid aviation journalist some 20 years later, however, when an opportunity presented itself to fulfil a lifelong ambition, and he was invited to accompany the inaugural Vickers Viking Safari Service from the UK to Kenya. The service had been established as a joint venture by Airwork Ltd and Hunting Air Transport Ltd, in the summer of 1952.

A straw in the wind

In May 1952 a report in British aviation weekly *Flight* hinted that the government's policy on civil aviation was about to undergo some changes. With the state-run airlines (BOAC for long-haul operations and BEA covering the short- and medium-haul services) receiving direct government subsidies for the acquisition of aircraft and the development of infrastructure, and the smaller charter companies fending for themselves with what was left for predominantly domestic routes, it was proving difficult for the latter to make ends meet.

Under the arrangements then in place, the Air Transport Advisory Council, established as a licensing authority under the Civil Aviation Act of 1947, considered applications from independent air companies to operate scheduled services as associates of the corporations, advising the Minister of Civil Aviation on the acceptance or otherwise of such applications.

When the official announcement of a new air policy came shortly afterwards, it stated that the government would henceforth favour a combination of public and private enterprise, based on whatever was in the best interests of British civil aviation. The idea was to reduce the cost of air transport to the taxpayer and to provide greater opportunities to private concerns to take part in the development of air transport without impairing the strength of Britain's state-sponsored international air services. This meant that the two air corporations and the independent operators were free to apply to operate new scheduled services in defined categories, but that the corporations' existing networks would remain exclusively reserved to them.

Foreshadowing the possible outline of this new air policy, however, was another short report in the same issue of *Flight* detailing "important news leaked out" that a joint venture was in the offing between two of the UK's leading charter operators, Airwork and Hunting, to provide a service between London and Nairobi, the Kenyan capital. The intention of the enterprise was to establish a service complementary to those already available (BOAC had operated Handley Page Hermes propliners on routes down through East Africa to Johannesburg since 1950, and introduced the de Havilland Comet jetliner on the route that month), by offering a low-fare short-stage, i.e. slower, run down to Africa alongside BOAC's high-speed services. Hunting and Airwork were confident that there was a substantial number of passengers who would be willing to take longer on the route to get cheaper fares, and some who would not be able to travel at all at the BOAC rate, thus opening a gap in the market.

Despite questions in Parliament about the new air transport policy (the Opposition asked whether BOAC would have ordered the Comet had it known that the development of new overseas scheduled services were to be opened to both the

The John Stroud Archive

One of Britain's most respected aviation journalists and authors, John Stroud (born April 3, 1919) joined Imperial Airways aged 14. Six years later he became a freelance aviation writer and in 1963 was appointed General Editor of the Putnam series of aeronautical books. Also a talented photographer, John continued to publish material until his death in March 2007. In 2014 a substantial part of John's archive — including numerous rolls of previously unseen 35mm film — was acquired by A Flying History Ltd, and forms the basis of this regular *TAH* series

On the outbound journey from Blackbushe to Nairobi, the stewardess aboard Viking 1B G-AJFS (c/n 237) was Erna Ferguson, whom John photographed beside the aircraft as it was being refuelled at one of the route's early stops, possibly Malta, before pushing on to the next waypoint on the inaugural return Safari Service on June 14–20, 1952.

corporations and independent operators), the new approach was officially adopted, and in mid-June 1952 it was announced that a new weekly service between London and Nairobi, to be operated under an associate agreement with BOAC, was to be inaugurated by Hunting Air Transport and Airwork that month.

Slower but cheaper

This new operation was aptly named the Safari Service (it was reportedly originally to have been called the Silver Queen after the Vickers Vimy in which the first England—South Africa flight was begun in February 1920) and was designated as a "C-Rate" route, denoting a slower service over shorter stages in less luxurious aircraft but "still with a high degree of personal service". Both Airwork and Hunting would use Vickers Vikings for the service, which would take two-and-a-half days to reach Nairobi, with night stops at Malta and either Khartoum or Wadi Halfa in Sudan, compared to BOAC's 24hr service to South Africa.

The fares for the Safari Service were set at £98 single and £180 return (in contrast to BOAC's £140 and £252 respectively), which included all meals, coach services between airport and accommodation at all stops and a generous baggage allowance of 66lb (30kg) per person. Services were to be flown alternately (i.e. every other week) by each company, each Viking carrying 27 passengers attended by one air hostess, although the inaugural service would see both companies flying a return service over the route. Both would continue to work from their home bases — Bovingdon for Hunting and Blackbushe for Airwork — and the crews and aircraft would operate with their own insignia and uniforms.

Tickets between the two airlines would be interchangeable, both using the same route: London—Nice—Malta—El Adem (Libya)—Wadi Halfa (Sudan)—Khartoum (Sudan)—Juba (Sudan)—Entebbe (Uganda)—Nairobi. Commenting on the prospective new service, *Flight* observed in its June 13, 1952, issue that "its progress will be closely studied, and the lessons learned may have a direct influence on the opening — or otherwise — of further overseas services by independent companies".

Off on safari!

Thus it was that John Stroud found himself at Airways Terminal behind London's Victoria train station at 0645hr on June 14, 1952, awaiting transport for the first leg of the Safari Service — a coach to Blackbushe (he was to fly Airwork outbound and Hunting on the return). On arrival at the Hampshire airfield, the passengers boarded Viking G-AJFS, whose two Bristol Hercules engines were started at 0900hr sharp. John recalled in his subsequent report for *Flight*:

"We taxied out in the gloom of an English June day, sped past the sodiums, entered cloud at about 800ft [250m] and set course for Nice."

At the controls of the Viking was Capt Wallace Covington, aided by Flight Officer Charles Phillips, Radio Operator Ronald Church, Flight Engineer Frank Fosdick and, in the cabin, stewardess Erna Ferguson.

After a flight of 3½hr, taking in the Matterhorn and Mont Blanc in the distance, the glittering Mediterranean came into view and the Viking touched down at Nice, where it taxied in beside a BEA Viking and the VIP-configured Consolidated Liberator of Bào Dai, the head of the Vietnamese state (see *Fit for the King*, *TAH6*). With the sea a pebble's throw from

The Airwork Viking taking on fuel from a bowser at one of the more remote stops on the outward journey. Viking G-AJFS had made its first flight in August 1947 and was delivered new to Airwork the following month. **BELOW RIGHT** *Flight Officer Charles Phillips checks the map in the cockpit of G-AJFS during the outbound flight.*

the runway and the weather living up to the reputation of the South of France as the perfect holiday destination, John was reluctant to leave after a 90min refuelling stop, the passengers re-embarking and the Viking getting away at 1450hr local time.

Cruising at 9,500ft (2,900m) the Viking passed the jagged peaks of Monte Cinto and the Corsican mountains before heading out over the Strait of Bonifacio towards Sardinia to cross the western end of Sicily, bound for Malta, where it touched down at 1759hr local time after 3hr 10min. Within half an hour the Hunting Viking, G-AHPJ, had joined the Airwork machine at Luqa, having been delayed by searches for two aircraft that had ditched earlier that day, one an Airspeed Consul off Beachy Head and the other an Italian aircraft reported to have come down in the sea.

Into Africa

Malta was the first overnight stop and the passengers were duly transported to the Phoenicia Hotel in the capital, Valletta, from where they were picked up again the following morning at 0400hr local time. By 0630hr both Vikings were en route for the next refuelling stop at El Adem, about ten miles (16km) south of Tobruk. While descending into El Adem, John noted thousands of tracks and "black things . . . presumably tanks and trucks" in the sand below, decaying souvenirs of the still comparatively recent desert war. Landing just after 0900hr local time at El Adem, the passengers disembarked while the Vikings were refuelled, John being somewhat unimpressed with the facilities: "Apart from the tortoise in the children's sand pit, [El Adem] holds no great attraction to encourage a prolonged stay".

Indeed, within an hour, the Vikings had set sail again, this time for the long 800-mile (1,290km)

BELOW *Hunting's Viking 1, G-AHPJ, joined G-AJFS (c/n 147) at Luqa, the two continuing together for the rest of the outbound flight to Nairobi, although they only flew together for the inaugural service. The Hunting machine had the distinction of being the first Viking to be delivered to an independent UK operator, back in May 1947.*

ABOVE ***With its natural metal finish flashing in the North African sun, Hunting's G-AHPJ was captured by John's camera from the cabin of G-AJFS while flying over the Libyan Desert on the El Adem—Wadi Halfa sector. The Hunting Viking was enjoying a second lease of life, having been completely rebuilt after a crash at Croydon in 1947.***

LEFT ***The square cabin windows of the Viking provided good views of the exotic sights below for the passengers, John particularly noting that the over-desert sectors were not as boring as one might imagine: "There is a great variety of colour and many interesting types of hill formation, while the oases of Siwa, Farafra and Dakhla can all be seen before the Nile appears at the Egyptian-Sudanese border."***

BELOW ***The two Vikings at Wadi Halfa on the outward journey. The airport is about eight miles (14km) east of the town and only accessible by means of a dusty track. Wadi Halfa was of particular interest to John, as his childhood hero, Sir Alan Cobham, had stopped there during his pioneering survey flight to Cape Town in South Africa for Imperial Airways in 1925.***

trawl across the desert to Wadi Halfa in the extreme north of Sudan, where the travellers caught their first glimpse of the mighty Nile. After nearly 4hr aloft, the Vikings arrived at the airport east of Wadi Halfa at 1355hr to take on fuel for the next leg to Khartoum, with Sudan Airways providing all services, the personnel of which John noted as being cheerful and professional, despite having to work outside in temperatures up to a scorching 65°C (150°F).

After a half-hour stop, the Vikings took off for the last stop of the day, at Khartoum across the Nubian desert, leaving the Nile far to the west, only to be reunited with it after an hour or so at Kareima — which held personal significance for John, as it had been used as a Short Calcutta flying-boat refuelling point by Imperial Airways. At the time, Khartoum Airport was undergoing substantial expansion and could only be used by Sudan Airways' de Havilland Doves, so the Vikings made for the airport at Wadi Seidna, near Omdurman on the western bank of the Nile, about 20 miles (32km) from Khartoum on the opposite bank, landing at 1650hr local time.

The evening was spent at the Grand Hotel in Khartoum, where, on opening the door to his room, John found himself face to face with a monkey, "but on closer inspection I found he was a pet and chained to the balcony. The lizards, however, were neither chained nor pets".

If it's Monday, it must be Uganda

After watching the sunrise from the terrace at the Grand Hotel as the pelicans took their morning cruise over the Blue Nile, the passengers were taken back by coach to Wadi Seidna, from where they took off at 0713hr and set course for Entebbe in Uganda, some 1,100 miles south (1,770km). Such a long flight, the longest single sector of the service, revealed changing terrain as the flight progressed, from the nondescript monotony of the desert to the swamp area south of Malakal in southern Sudan (another old Imperial Airways call). Shortly after 1100hr the Vikings were over Juba, where the ground became greener and began to rise towards the Sudan-Uganda border.

As the Viking let down over the northern shores of Lake Victoria, distinctive African huts were visible below, giving way to more modern accommodation as the aircraft descended into Entebbe Airport at 1257hr after nearly 6hr aloft. The passengers were given lunch while the Vikings were refuelled, the spotters among the party enjoying the opportunity to see 20 years of de Havilland transport development in the form of BOAC Comet G-ALYP and local D.H.83 Fox Moth VP-KBS sharing the apron.

By 1510hr local time the Vikings were airborne again and heading south over Lake Victoria to cross the Equator and complete the comparatively short 1hr 50min flight to Eastleigh in Nairobi, where G-AJFS set down at 1659hr local time, followed by Hunting's G-AHPJ a few minutes later, concluding the inaugural outbound Safari Service. As John reported: "For the passenger who wants to see something of Africa there is no better way of travelling. The sectors are not too long and the height at which we flew offered good views. Food and cabin service were good throughout; schedule-keeping and ground-handling were equally good."

One of several gleaming Lockheed Lodestars of East African Airways at Nairobi West during John's visit, VP-KFA (c/n 18-2076), named **RMA Lake Victoria**, *was a former BOAC example (ex-G-AGBT* **Lincoln**), *and, like all the company's Lodestars, was highly polished, as the groundcrew member* **(BELOW RIGHT)** *demonstrates.*

There was little time to sample the delights of Nairobi, however, as John was scheduled to fly back with the Hunting Viking on the inaugural return service two days later. This left only one day spare in the Kenyan capital, which he chose to spend at the HQ of BOAC subsidiary East African Airways (EAA) at Nairobi West, the capital's main civil airport during the pre-war years, but not suitable for the larger heavier types now flying into the city.

Propliner motherlode

A short drive out to Nairobi West (known as Wilson Airport from 1962) revealed a treasure trove of the smaller propliners operated by EAA, including several Lockheed Lodestars undergoing maintenance and check flights, and a Rapide being given its final Certificate of Airworthiness in EAA service. While John was being shown round, a Lodestar arrived from Entebbe, which, John noted, "like all the other East African aircraft, had one of the most polished exteriors I have ever seen". A trip to the Royal Nairobi National Park to photograph the exotic wildlife, including giraffes, followed in the afternoon.

At 0500hr local time the next morning, June 18, the East African Airways 1½-deck Commer

Looking decidedly cutting-edge among the predominantly pre-war-vintage propliners then operating in East Africa, Ethiopian Air Lines' colourful Convair 240 ET-T-20, named **Eagle of Ethiopia**, *awaits its next departure from Nairobi on what the airline dubbed "The Wonderland Route", connecting the various parts of East Africa and the Middle East.*

Formerly HB-ITE in Swissair service, Douglas DC-2 ZS-DFW (c/n 1322) was photographed by John at Entebbe, where the 1934-vintage airliner was plying its trade for Phoenix Airlines. It may be one of the last photographs of the machine, as it was destroyed in a landing accident at Kosti, south of Khartoum, two months later.

Commando coach departed the Norfolk Hotel in the dark, depositing its passengers at Eastleigh for their breakfast before commencing their long trek back to the UK. First light revealed Hunting's G-AHPJ standing alongside one of the two Ethiopian Airlines state-of-the-art Convair 240s the company had acquired in 1950. Ever the intrepid journalist, John got talking to the green-uniformed crew and was invited aboard for a quick look around. "It would have been interesting to have stayed put, and had morning coffee in Ethiopia!", he mused.

The Hunting crew for the return journey comprised Capt George Clift, First Officer Clive Kirkland, Radio Operator D. Parsey, Engineer Officer O. Mitchell and Chief Hostess Jane Jeffries. With all aboard, 'HPJ started up and departed Eastleigh at 0655hr local time, bound for Entebbe to pick up another passenger (Entebbe being an "on-demand" stop on the route). An uneventful 1¾hr later, the Viking landed at Entebbe in the wake of BOAC Comet G-ALYW, which was undertaking its first service. Getting out of the Viking to stretch his legs, John was delighted to find one of Swissair's original Douglas DC-2s on the tarmac, now operating in the colours of Phoenix Airlines of Pretoria as ZS-DFW.

After a 45min stop at Entebbe it was back on board the Viking for the 2hr flight to Juba, which had been missed out on the outbound flight as there was no traffic to be picked up there and the Vikings had sufficient fuel to carry on. The sector to Juba took the Viking over the magnificent Murchison Falls in Uganda, John also noting the large numbers of elephants and hippos below.

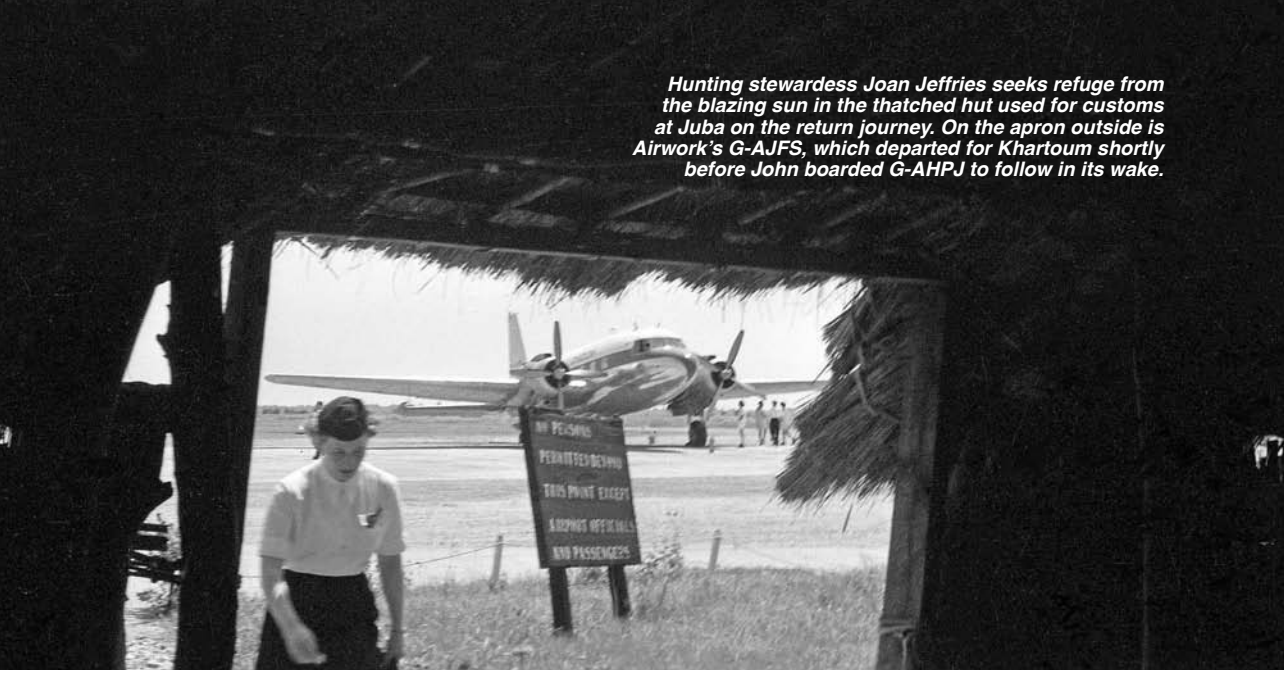
At Juba the two Vikings were reunited, Airwork's G-AJFS having flown direct to Juba from Nairobi. The orangeade supplied in the thatched hut used for customs at Juba was welcome, but this remote outpost offered little

MAP BY MAGGIE NELSON

else in the way of facilities. As John reported:

"Loofahs were growing on the roof and walls and we braved the fierceness of the sun to watch the Airwork Viking take off. Soon after, we braved the greater fierceness of the hot cabin of our own aircraft and set off ourselves."

The 4hr flight to Khartoum passed without incident, other than some small route deviations



Hunting stewardess Joan Jeffries seeks refuge from the blazing sun in the thatched hut used for customs at Juba on the return journey. On the apron outside is Airwork's G-AJFS, which departed for Khartoum shortly before John boarded G-AHPJ to follow in its wake.

and a slightly higher cruising altitude of 11,000ft (3,350m) to avoid some impressive cloud formations, and some spectacular views of the swing railway bridge at Kosti and the White Nile Dam. At 1625hr local time the Viking landed back at Wadi Seidna, where the Airwork crew was setting off into Khartoum for its overnight stay. The Hunting service overnighted at Wadi Halfa, however, so after a quick refuelling, which gave just enough time for John to watch BOAC Hermes IV G-ALDE *Hanno* depart northward in a cloud of dust, the Hunting Viking soon followed it, and after 2¼hr landed at Wadi Halfa at sunset. The view from the window on approach had been spectacular, as John noted:

"As we approached the airport the sun sank down over the desert, and that short twilight that followed was one of the most beautiful things I saw on the whole trip. The beauty and peace of the scene made me want to wander off into the desert for a while. Such sunsets make any day's heat worthwhile and for me this was a fitting end to a day which had included a journey of nearly 2,000 miles (3,200km) and a total of nearly 10½hr."

The final leg

After a night at the Nile Hotel in Wadi Halfa, the comparatively leisurely start — 0900hr — gave John and his travelling companions the chance to pay an early morning visit to the waterways of the Nile and the town's railway sheds before the bus trip across the desert, past camel trains, to their awaiting Viking. The rest of the day was spent completing the long sector from Wadi Halfa to El Adem, which took 4¾hr, and the 3hr sector from El Adem to Malta, where G-AHPJ arrived at 1827hr local time for an overnight stay.

The following morning, June 20, saw John at Luqa, "sorting our Viking out from a mass of similar aircraft, three of which belonged to Hunting, two to Airwork and one to BEA". He also noted the presence of a Miles Gemini, an Avro Tudor 5 of charter airline William Dempster Ltd and an *Aéronavale* Lancaster. At 0833hr the Viking departed Luqa, and arrived to "wonderful weather" at Nice 3½hr later, at which point lunch was served. Despite an understandable reluctance to leave the sunny, drowsy beach atmosphere of Nice, John and his companions boarded G-AHPJ for the final leg back to the UK, the Viking departing at 1330hr.

With distinct holiday's-end resignation, John noted that "over France cloud built up and later we skirted the London area in drab weather; at Bovingdon it seemed positively cold" — perhaps unsurprisingly after nearly a week in deepest Africa. The Viking arrived back at Hunting's base at 1625hr on June 20, John noting in his report that "the whole journey out and back had involved 48hr 43min total flying time. It had been comfortable, not over-tiring, in spite of the heat, and in general, a credit to British air transport".

Happily, the Safari Service went on to become a major success for Airwork and Hunting, and in February 1953 the consortium was granted a seven-year licence to operate East, Central and, from 1955, West African Safari Services (see *A Flying Safari, TAH6)*. The two companies continued to operate profitably to Africa until well after their merger into British United Airways in July 1960.

The inaugural Safari Service in June 1952 had been a grand success, not only in proving the viability and profitability of the route, but also in fulfilling the ambition of the 13-year-old John Stroud to follow in the footsteps of his pioneer hero, Sir Alan Cobham, to Africa.

BRUTE FORCE & INNOVATION

FLYING THE BUCCANEER S.1 & S.2

GP CAPT TOM EELES COLLECTION

Wing Commander Tom Eeles climbs down from the cockpit of his Buccaneer S.2B while Officer Commanding No 237 Operational Conversion Unit at RAF Lossiemouth in 1986, having reached the considerable milestone of 2,000 hours on type. By the time of his retirement he had reached a total of 2,185 hours on the Buccaneer.

Former Blackburn Buccaneer pilot **Gp Capt TOM EELES** can claim the rare distinction of having flown the two variants of the brawny strike fighter for both the Fleet Air Arm and the RAF. To celebrate the 60th anniversary of the maiden flight of the Buccaneer in 1958, Tom provides a first-hand account of what the brutish but innovative "Brick" was like to fly

AFTER A YEAR on my first RAF squadron tour flying English Electric Canberra B(I).8s in Germany, I volunteered in 1966 for loan service with the Fleet Air Arm to fly the Blackburn Buccaneer. The aircraft had always intrigued me and I recall being very impressed by its display at the 1964 SBAC Show at Farnborough.

The Buccaneer was originally designed to meet a Royal Navy requirement for a long-range strike aircraft capable of being launched and recovered from the existing fleet of Royal Navy aircraft carriers, to counter the threat of the Soviet Navy's then-new *Sverdlov*-class heavy cruisers. The weapon to be used would be the British tactical nuclear device known as the Target Marker Bomb. Compared to what had been used in the Second World War to mark targets, this weapon, also known as *Red Beard*, would have created an impressive and extremely visible indication of its target! The delivery profile chosen involved a high-speed low-level run-in, culminating in a looping manœuvre, releasing the weapon to fly on towards the target with the aircraft escaping in the opposite direction. An earlier version of this delivery technique, known as the Low Altitude Bombing System (LABS), had been developed by the USA and was used by the RAF's Canberra squadrons.

The Royal Navy selected the Blackburn Aircraft Company's submission, designated NA.39. The company's design concept was for a two-seat swept-wing twin-engined aircraft designed to fly at high transonic speed at very low level. Unlike the work being undertaken concurrently by other aircraft manufacturers to design a Canberra replacement for the RAF, supersonic flight was never intended for the NA.39, as it posed too many difficulties for a carrierborne aircraft.

The NA.39 employed the "area rule" concept to reduce drag in the transonic flight regime, which resulted in the distinctive "Coke bottle" bulge of its rear fuselage. This fortuitously provided ample space for the bulky boxes of

OPPOSITE PAGE ***The author leads a two-aircraft formation in S.2B XZ432 during a photographic sortie over the west coast of Scotland, near Oban, on March 11, 1987. Tom enjoyed three tenures with No 237 OCU, a specialist Buccaneer training unit: as a QFI during 1971–72; CFI 1977–79 and OC 1984–87. Photograph by GEOFFREY LEE.***

GP CAPT TOM EELES COLLECTION

LEFT *Tom Eeles, back row centre, and his RAF and Fleet Air Arm companions on his Buccaneer conversion course with No 736 Naval Air Squadron (NAS) at Lossiemouth in July 1966. The unit had been re-formed in March 1965 as a Jet Strike Training Squadron equipped with Buccaneer S.1s, supplemented by S.2s from May 1966.*

BELOW *Pre-production NA.39 XK534 of No 700Z NAS, coded LM/683, rolls on to the "piano keys" at Farnborough before its display at the 1961 SBAC show. The air intakes of the S.1's Gyron Junior engines were considerably smaller than those required for the later more powerful Speys fitted in the S.2 variant.*

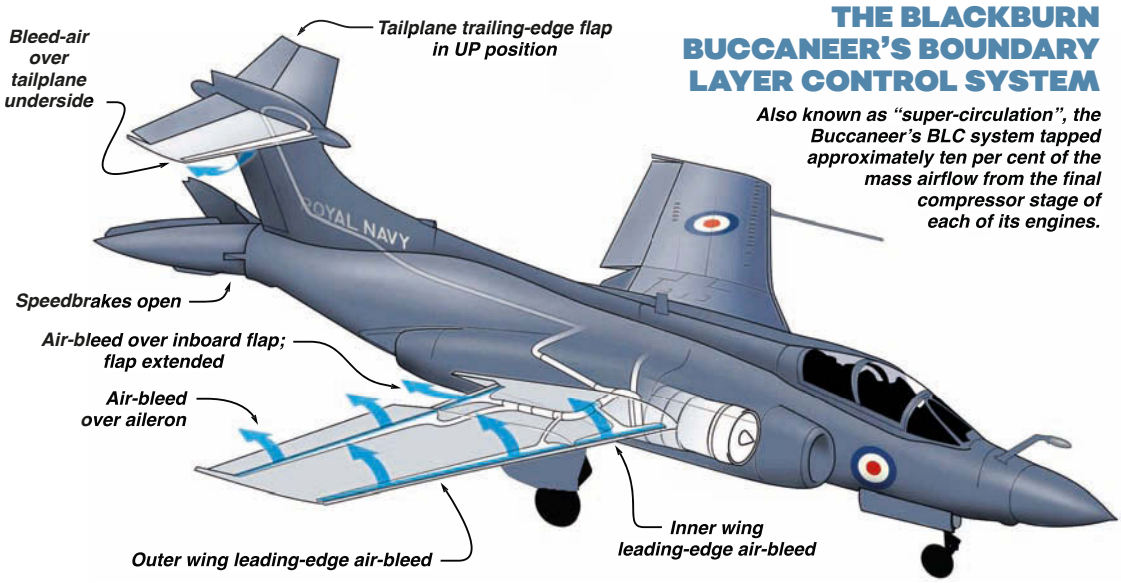
avionics associated with the weapons systems typical of those days before modern digitised equipment became available.

Blackburn claimed that the NA.39 was the first British combat aircraft designed from the start as a complete weapons system, rather than an aircraft on which weapons were hung in a somewhat random fashion. A version of the AI.23 AIRPASS radar system, operating in X-band and given the codename *Blue Parrot*, was used to provide long-range search and acquisition of discrete radar targets such as warships or coastal facilities. The range and bearing of a target marked and locked on to was fed to a Control & Release Computer (CRC), which in turn fed information to the pilot's head-up display (HUD), known as the Strike Sight. When the pilot "accepted" the attack by squeezing the trigger on the control column, a pull-up demand would be generated and displayed in the Strike Sight, and automatic weapon release would occur. *Blue Parrot* could also be used in a limited fashion overland.

The electrical power required by the radar was 200V AC, provided by an Air Turbine Alternator (ATA). However, the ATA had an unfortunate habit of going offline during a descent as engine r.p.m. reduced, thereby requiring a full resetting warm-up cycle for the *Blue Parrot* system, which took some time — not ideal in a tactical situation. The later Buccaneer S.2 variant's electrical generation system was completely revised and did not suffer from this problem.

The primary navigation aid was a Doppler system known as *Blue Jacket*, which fed information to the CRC and the observer/navigator's cockpit displays. A passive radar-detection device, the Wide Band Homer, provided the observer/navigator with an indication of the relative bearing of hostile radar emissions, which enabled the aircraft to start a descent to low level while remaining outside radar detection range. There was also a roller-map display, driven by *Blue Jacket*, but this

MIKE HOOKS



THE BLACKBURN BUCCANEER'S BOUNDARY LAYER CONTROL SYSTEM

Also known as "super-circulation", the Buccaneer's BLC system tapped approximately ten per cent of the mass airflow from the final compressor stage of each of its engines.

Artwork by JUANITA FRANZI / AERO ILLUSTRATIONS © 2018

was not popular as its use required extensive pre-flight preparation, involving the cutting and sticking of maps to fit the device.

The Integrated Flight Instrument System (IFIS) was similar to that fitted in the Folland Gnat and English Electric Lightning. The pilot's "roller-blind" attitude and navigation displays were driven by the output of a Master Reference Gyro; his altitude, vertical velocity, Mach number and indicated airspeed displays were obtained from the Air Data Computer. Standby flight instruments catered for failure of the IFIS. A very accurate radio altimeter and a precision deck-landing airspeed indicator were also incorporated. The observer/navigator was much less well provided for, with only a navigation display, true airspeed display and altitude display fixed permanently on the standard altimeter pressure setting of 1,013mb. The lack of an attitude display in the rear cockpit was a serious omission.

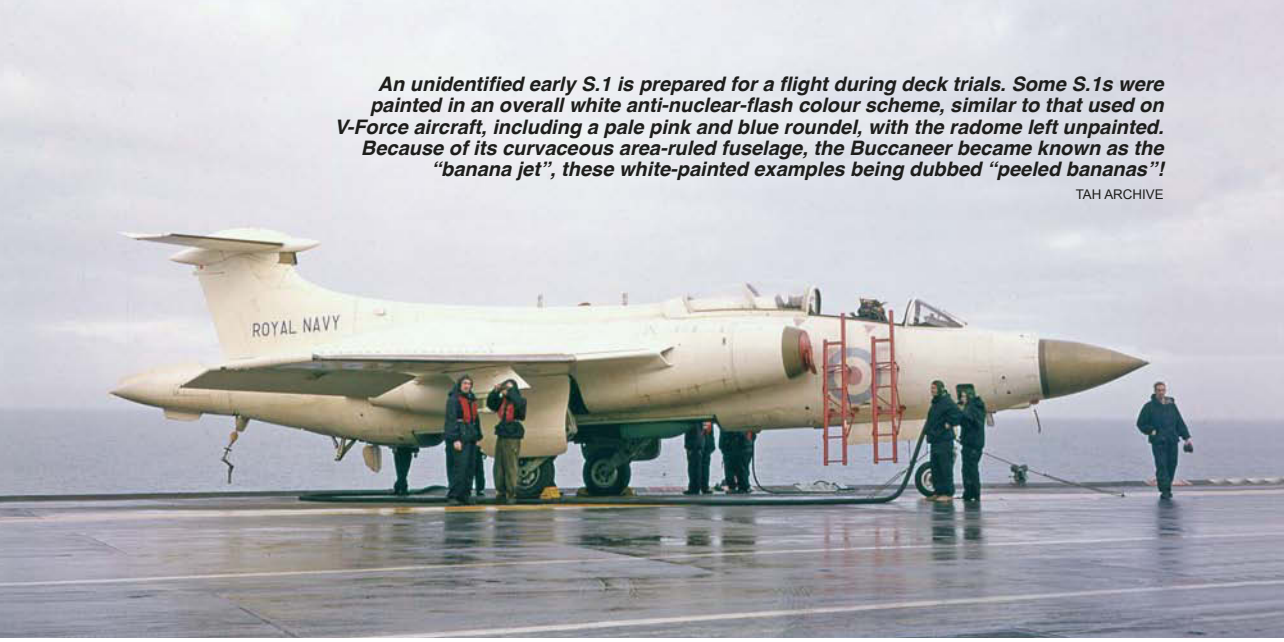
When the Buccaneer entered service with the Fleet Air Arm in 1962 it was realised that, in addition to its nuclear strike capability, it also had great potential as a conventional attack and reconnaissance aircraft. It was quickly adapted to carry a photo-reconnaissance pack and deliver a wide range of conventional bombs and rockets.

THE INNOVATIVE "BLOWN WING"

The small size of British aircraft carriers meant that launch and recovery would be a challenging issue for this large, heavy aircraft. The solution chosen by Blackburn to reduce launch and recovery speeds to acceptable levels was innovative. In addition to quite small conventional flaps fitted to the inboard non-folding wing sections, the ailerons could be drooped to provide additional low-speed lift augmentation. The entire wing was also immersed in high-pressure air bled from the engines, along the leading edges, flaps and drooped ailerons, thereby allowing the aircraft to be launched and recovered at much lower speeds than would have been possible without this "blown wing" arrangement.

The underside of the slab tailplane was also blown with high-pressure air and had a trailing-edge flap that moved in the opposite direction but through the same amount as the drooped ailerons. This was to counteract the strong nose-down change of trim that the drooped ailerons generated. This high-pressure air system, known as Boundary Layer Control (BLC), was unique to the Buccaneer in British service and remarkably trouble-free, although a similar less comprehensive "blown flap" system had been incorporated into the Supermarine Scimitar.

The engine chosen to power the NA.39, soon to be named Buccaneer, was the de Havilland Gyron Junior turbojet, a scaled-down derivative of the immensely powerful Gyron, which was never put into production. In the mid-1950s the Gyron Junior was the only engine that could sustain a reasonable thrust when BLC was selected, and which would fit into the space available in the airframe. Even so, thrust without BLC was not impressive at 7,300lb (3,310kg), which dropped to less than 6,000lb (2,720kg) with BLC selected. The engine intakes were small and the Gyron Junior's unreliable variable inlet guide vane system (IGV) was very sensitive to variations in airflow, often resulting in alarming intake banging, compressor stalling and loss of thrust. The position of the IGVs relative to engine r.p.m. was so critical that there



An unidentified early S.1 is prepared for a flight during deck trials. Some S.1s were painted in an overall white anti-nuclear-flash colour scheme, similar to that used on V-Force aircraft, including a pale pink and blue roundel, with the radome left unpainted. Because of its curvaceous area-ruled fuselage, the Buccaneer became known as the "banana jet", these white-painted examples being dubbed "peeled bananas"!

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was even a cockpit display of IGV position, the only instance I know of this being needed, despite every jet engine having variable inlet guide vanes. When BLC was selected, additional fuel was fed to the engine to restore some of the thrust loss. To prevent turbine burn-out, a turbine-cooling system had to be incorporated which fed cooling air into the turbine blades. To summarise, the Gyron Junior was a complex engine of inadequate thrust; it required careful handling and it could fail for any number of reasons. It was to prove to be the Achilles' heel of the Buccaneer S.1.

Early deck trials revealed that the Buccaneer was very sensitive to large pitch inputs at the low speed obtained after launch, and a pitch-up followed by loss of control could easily occur. To cure this problem another innovative solution, the "hands-off" launch technique, was developed. Before launch, the tailplane would be set to rotate the aircraft into the climbing attitude after launch. After accepting the launch, the pilot would brace his left arm to ensure the throttles remained at maximum power, rest his right hand on his knee beside, but not touching, the control column, only taking over control after the aircraft had left the catapult and was climbing and accelerating safely.

Even before the Gyron Junior-powered Buccaneer S.1 had formally entered service with the Fleet Air Arm, Blackburn realised that the Gyron Junior could only ever be an interim engine. The solution was to find a better engine that had more thrust, was much more reliable and which would fit in the space available in the airframe. Salvation came in the form of the Rolls-Royce Spey turbofan, which had a thrust of 11,500lb (5,215kg) reducing to about 9,500lb (4,310kg) with BLC on, and a much lower specific fuel consumption.

Two of the early Development Batch Buccaneers, XK526 and XK527, were re-engined, the former flying with the Spey for the first time on May 17, 1963, heralding the introduction of the Buccaneer S.2. The transformation was dramatic. Only 40 S.1s were built, but they had convinced the Fleet Air Arm that the Buccaneer was an outstanding strike aircraft. It is surprising that just three years later, when I started flying the type, the S.2 was already in full squadron service with two Fleet Air Arm embarked squadrons and the training squadron. Today entry into service of combat aircraft takes rather longer.

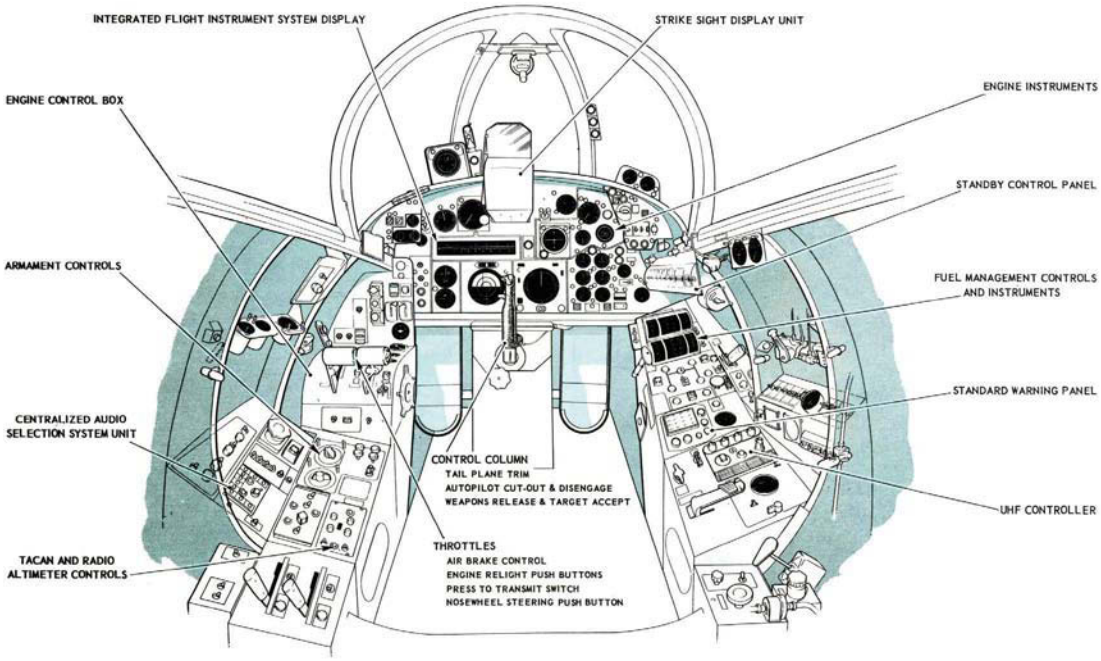
FROM THE COCKPIT

So what was it like to fly the Buccaneer? There was no dual-control version of the aircraft, so initial conversion work consisted of some flights in a Hawker Hunter two-seat trainer fitted with the Buccaneer's IFIS, followed by a number of simulator sorties. The S.1 simulator was a simple fixed-base device which did not replicate real-life Buccaneer handling qualities. However, it allowed systems management and emergency procedures to be taught. Your first flight in a Buccaneer was actually your first solo, but with a Qualified Flying Instructor (QFI) in the back seat to offer advice, encouragement and warnings, but with no capability to take over control in the event of difficulty or mishandling.

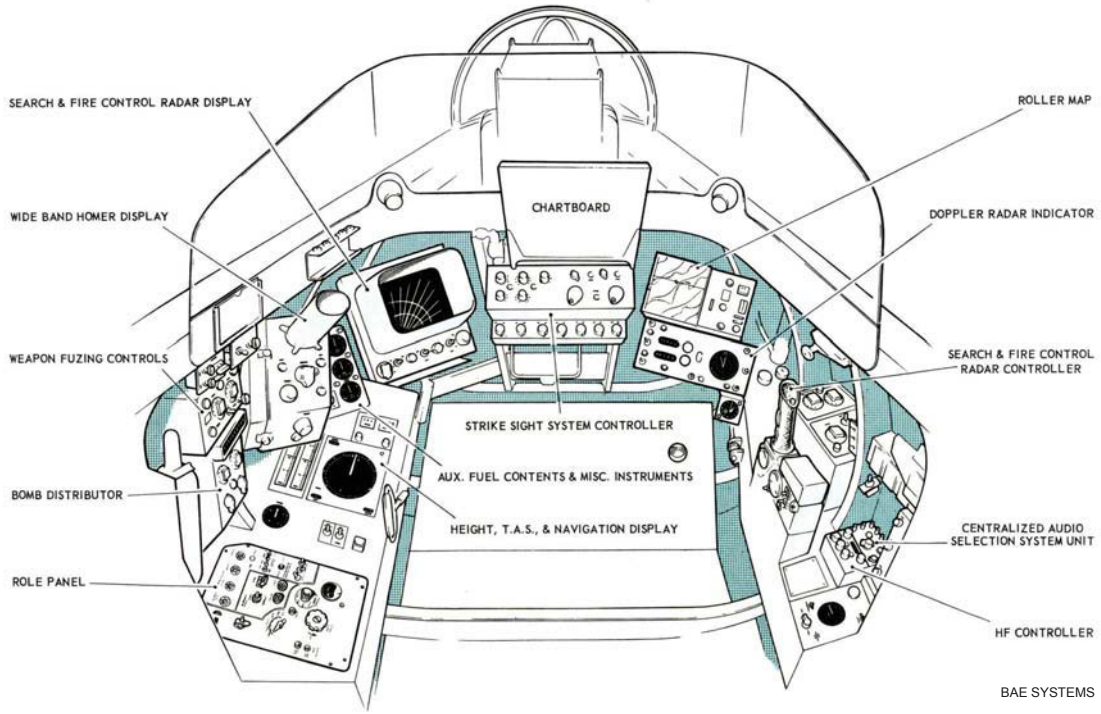
The first thing that struck you as you walked out was how big the Buccaneer was. Access to the cockpit was by a tall ladder and, once settled in, you realised how high up you were. The cockpit was quite snug; originally the instrument layout, dominated by the IFIS, was considered to be very good; but, over the years, with the addition of extra instruments and modifications, it earned the reputation of being something of an ergonomic slum.

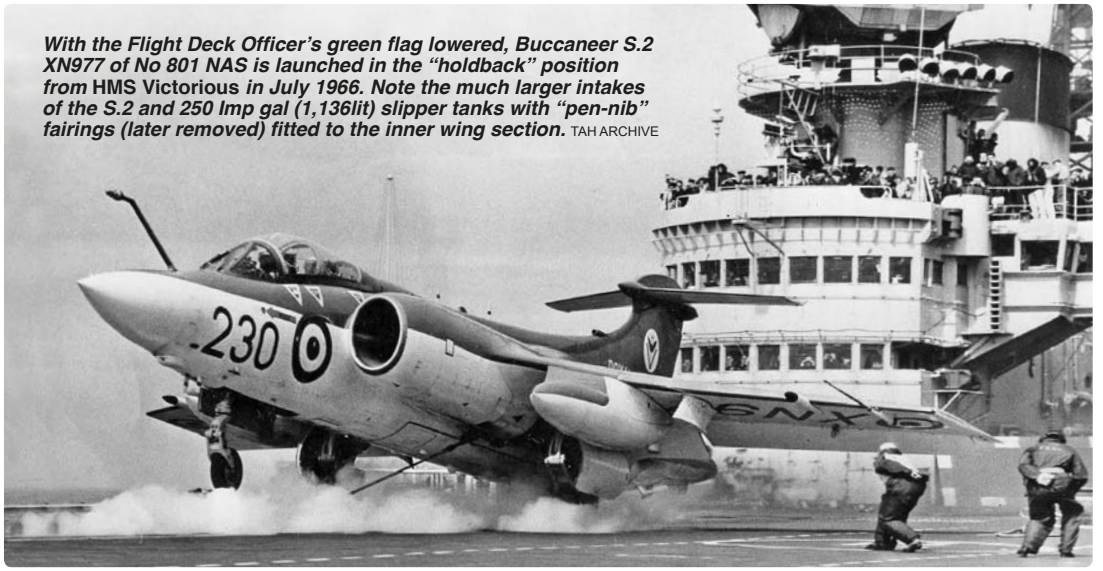
THE BLACKBURN BUCCANEER'S "OFFICE"

This pair of illustrations from an early Blackburn brochure for the Buccaneer shows the front and rear cockpits of the type, with the pilot's cockpit directly* BELOW. *The control column was unusual, in that it projected from the lower part of the instrument panel, rather than being hinged from the cockpit floor, as in most contemporary fighters.



BELOW ***The observer's duties included navigation, control of the search and fire-control radar, input of data into the Strike Sight system, fuzing of the armament and management of role equipment from the role panel. The role panels were interchangeable units which incorporated the relevant controls and instruments associated with the specific roles of the Buccaneer. Good forward vision for the observer was provided by the right-of-centre positioning of his seat, which allowed him to look over the pilot's shoulder.***





With the Flight Deck Officer's green flag lowered, Buccaneer S.2 XN977 of No 801 NAS is launched in the "holdback" position from* HMS Victorious *in July 1966. Note the much larger intakes of the S.2 and 250 Imp gal (1,136lit) slipper tanks with "pen-nib" fairings (later removed) fitted to the inner wing section. TAH ARCHIVE

There was no on-board starter system, so the engines were started by an external Palouste or gas-turbine starter trolley. Taxying was straightforward, using the nosewheel steering, which was engaged by depressing and holding a button on the right-hand throttle. Use of differential braking was not very effective as the main undercarriage had a relatively narrow track; later RAF Buccaneers had more effective brakes that were quite "snatchy" in operation at low speed.

Airfield take-offs in the S.1 were rather protracted affairs. Once lined up, it was necessary to coax the Gyron Juniors up through the IGV operating range to full power, which could be held without difficulty with the brakes. Sometimes this entailed turning the aircraft into the prevailing crosswind in order to avoid compressor surge. The BLC system was never used for S.1 airfield take-offs owing to the reduction in the already low maximum available thrust. On brake-release the S.1 would accelerate sedately, rotating at 150kt to unstick at 170kt. The S.2 had a far more sprightly take-off performance; the brakes would hold up to 85 per cent power, acceleration was brisk and, if necessary, owing to runway length or the aircraft's all-up weight, a take-off with BLC selected could be undertaken, which gave a lower unstick speed and a shorter take-off roll.

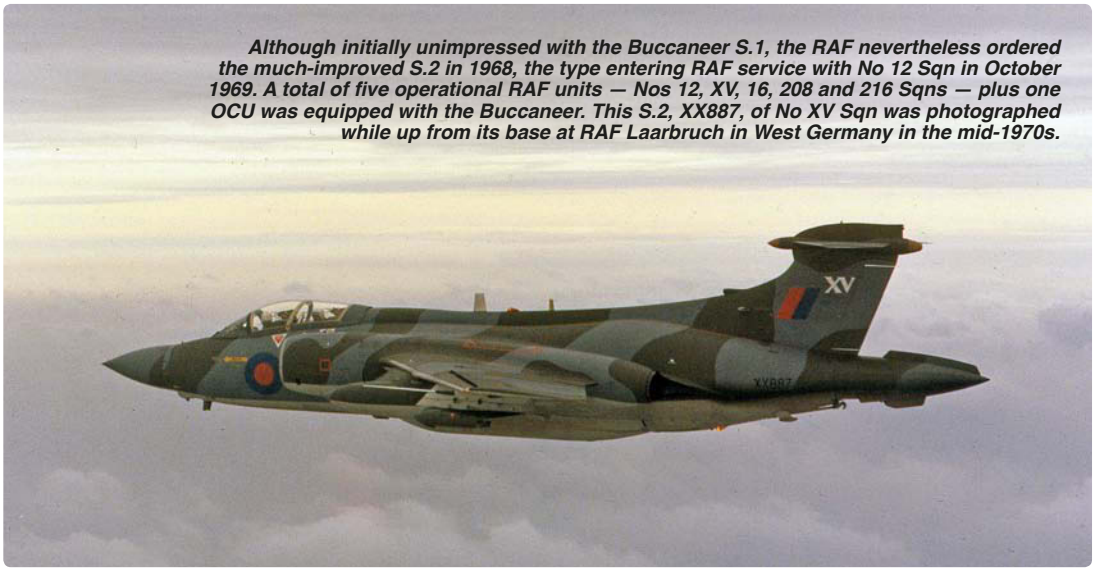
For catapult launches, the aircraft would be tensioned up into the take-off attitude, being restrained by the "holdback" — a frangible metal device connecting the rear of the aircraft with a slot in the deck. This would hold the aircraft when full power was applied, but disconnect when the catapult was fired. Flaps and ailerons were set to their maximum deflection of 45° flap and 25° for both aileron-droop and tailplane flap (known by the aircrew as "45/25/25") with BLC on, and the tailplane trim was set to a pre-calculated figure that would rotate the aircraft a couple of degrees after launch. Full power would be selected when signalled by the Flight Deck Officer (FDO).

The DECK TAKE OFF button could be depressed, allowing the undercarriage to be selected up while still on deck. The undercarriage would then retract automatically the moment the aircraft left the catapult and the oleo legs extended. After checking that full power had been achieved and that BLC pressures were sufficient, you would brace your left hand behind the throttles and raise your right hand to show the FDO that you were happy to go. Then you rested your right hand on your right thigh close to, but not holding, the control column and waited for the catapult to fire.

CLIMB AND CRUISE

After the initial very rapid acceleration from the catapult, the S.1 would continue to accelerate agonisingly slowly, while in contrast the S.2 experienced a much better speed increase. This in itself led to some handling problems resulting from pitch-up after launch, cured by reprofiling the underwing tanks and making some changes to the after-launch procedures, such as leaving the undercarriage down to be retracted normally.

The pilot would carefully take control after launch, cleaning up the flaps and aileron-droop and accelerating to the aircraft's normal operating speed of 350–580kt. Climbing speed was 400kt, converting to M0·85. The S.1 climbed slowly, but the S.2 was much quicker and gained height rapidly. The enormous airbrake — two large petals at the rear of the fuselage — enabled a very dramatic rate of descent to be achieved and a very rapid deceleration from high-speed flight. This could sometimes be used to force



Although initially unimpressed with the Buccaneer S.1, the RAF nevertheless ordered the much-improved S.2 in 1968, the type entering RAF service with No 12 Sqn in October 1969. A total of five operational RAF units — Nos 12, XV, 16, 208 and 216 Sqns — plus one OCU was equipped with the Buccaneer. This S.2, XX887, of No XV Sqn was photographed while up from its base at RAF Laarbruch in West Germany in the mid-1970s.

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a pursuing fighter to overtake inadvertently, thereby reversing the tactical situation.

At normal operating speeds and at medium and low level, the Buccaneer was a delight to fly. Three-axis auto-stabilisation provided excellent control response and harmony, with spring-feel for the ailerons and q-feel (artificial feel) for longitudinal control. Aerobatic manœuvres were limited to rolls, barrel rolls and rolls off the top of a loop. The Buccaneer was prone to inertia coupling *[a potentially catastrophic phenomenon in which the inertia of the heavier fuselage overpowers the aerodynamic stabilising forces of the wing and empennage, resulting in violent pitching and yawing and loss of control as the aircraft rotates about all three axes — Ed.]* if excessive rates of roll were applied, as some pilots found out to their cost! The odd brave soul would attempt a complete loop but it needed very careful monitoring and control of the speed increase on the way down.

Perhaps surprisingly, the S.1 generally handled better than the S.2; it was lighter, more stable in pitch, had a subtly different wing planform — no wingtip extensions — and a different centre of gravity. Its smaller air intakes meant that it did not suffer from intake momentum drag at the top end of the speed range, around 550–580kt, as the S.2 did, but it suffered badly from intake banging, especially when flying in the buffet or at excessive angles of incidence.

At high speed and low level the Buccaneer always felt rock solid. It was straightforward to fly in formation and a good platform for weapons-delivery and instrument flying. Air-to-air refuelling was a regular feature. Early S.1s had a retractable probe, which caused great problems as the airflow around the nose radome deflected the basket away, so it was replaced by a longer fixed probe.

APPROACH AND LANDING

Below 300kt the Buccaneer was much less responsive. Aileron control could be improved by selecting low-speed gearing but, as flaps and aileron-droop was lowered, control became heavier and less positive. The BLC system had to be selected with any aileron-droop setting beyond 10°, and it was vital to check when

Buccaneer S.1 XN960 demonstrates the type's highly effective split airbrake as it comes in to land at Le Bourget during the 1963 Paris Air Salon. The airbrakes were extensively tested and modified during the Buccaneer's trials programme, with strakes of various sizes added above and below the petals until the most effective configuration was found.

MIKE HOOKS

GEOFFREY LEE / BAE SYSTEMS

ABOVE ***Another photograph of the author's two-aircraft formation of No 237 OCU S.2s during a photo sortie from Lossiemouth in March 1987. Nearest the camera this time is XV352, which was later used as part of a nine-aircraft formation for a final photo-call for the Buccaneer before the type was retired from RAF service in March 1994.***

selecting aileron-droop that the electrically driven trim-balancing flap on the tailplane followed it up; longitudinal control would be lost if more than a 10° difference occurred.

In the landing pattern, turns needed to be initiated with rudder as well as aileron, as the aircraft suffered from adverse aileron yaw with the ailerons drooped beyond 10°. The final approach was flown at a constant speed/angle of attack, assisted by the excellent audio angle-of-attack device known as the Airstream Direction Detector (ADD), the final approach speed being in the region of 125kt with BLC on, 155kt with BLC off. It was not possible to land aboard with BLC off. The landing was no-flare, no-throttle-back; retarding the power would result in loss of BLC, leading to pitch-up and possible stall. For shore landings, once on the ground the nose would be raised to use aerodynamic braking.

Arrested landings aboard a carrier resulted in a very abrupt deceleration. As soon as this was felt the power was reduced, the aircraft rolling back a small distance from the pullback of the arrester wire, allowing the hook to be selected up and the wings to be folded, followed by a brisk taxy under the control of the flightdeck handlers to clear the landing area. We were told that their signals were mandatory and if you were taxied over the side it was their fault, not yours.

If for some reason the aircraft ditched, perhaps after a failed launch, the Buccaneer's Martin-Baker ejection seat was fitted with an underwater escape facility, which would automatically release the occupant from the seat and inflate his life jacket, allowing him to rise to the surface, provided the canopy had been jettisoned. The underwater facility was normally selected for launch and recovery.

Single-engine approaches and landings were no real problem in the S.2 but no fun in the S.1, which had no "go-round" capability on one engine below 400ft (120m).

UNWANTED STEPCHILD

The Buccaneer's career as a front-line combat aircraft was in many ways bedevilled by politics. The RAF showed no interest whatsoever in the S.1, pinning all its hopes on the ill-fated BAC TSR.2. The Royal Navy, when it fully appreciated the S.2's capabilities, planned to upgrade it to what it and Hawker Siddeley designated the Buccaneer S.2 Star, with a substantial part of the TSR.2's avionics replacing the original weapons system and navigation equipment. Ferranti had been lent an early Development Batch S.1, which was flown from Turnhouse to test the TSR.2's avionics systems, which gave rise to the S.2 Star proposal. However, the S.2 Star project fell by the wayside when the Labour government cancelled the CVA-01 carrier project in 1966 and initiated the early rundown of the Royal Navy's fixed-wing carrier fleet.

The RAF rather reluctantly took the S.2 as a TSR.2 replacement, but initially refused to upgrade the weapons and navigation systems, claiming that the aircraft was only a stopgap solution while hoping for something better from the Multi-Role Combat Aircraft (MRCA) project. Nevertheless, in addition to inheriting the Fleet Air Arm's Buccaneers, the RAF ordered another 43 new-build examples.

The Buccaneer remained in service from 1962 to 1978 with the Royal Navy and from 1969 to 1994 with the RAF. Incremental upgrades were made over the years, including the introduction of both versions of the Anglo-French Martel anti-shipping missile; the Westinghouse AN/AVQ-23E Pave Spike laser designation pod;

AIM-9 Sidewinder air-to-air missiles; the ALQ 101-10 electronic countermeasures pod; a radar-warning receiver; chaff and flare dispensers; the BAe Dynamics Sea Eagle anti-shipping missile and an improved navigation suite incorporating the FIN 1064 inertial platform.

Those lucky enough to fly the Buccaneer in RAF service had great affection for the aircraft and it had an enviable reputation in both the land and maritime strike roles. Despite its legendary reputation for ruggedness, a fatal accident occurred in 1979 when a wing latch-pin failed in flight; all latch-pins were quickly replaced. Tragedy struck again in January 1980 when an inner wing failed during a Red Flag sortie in the USA, leading to grounding, repairs and a considerable reduction in numbers.

By this time the Panavia Tornado, a development of the MRCA programme, had replaced the Buccaneer in Germany and the three remaining units — Nos 12 and 208 Sqns and No 237 Operational Conversion Unit (OCU) — relocated to Lossiemouth in Scotland. Two of the units — Nos 12 and 208 Sqns — were assigned to the maritime strike role, and the introduction of the Sea Eagle "fire and forget" anti-shipping missile forced the RAF to upgrade the type's navigation suite with the introduction of an inertial platform, but it was an austere upgrade. The Buccaneer was finally retired in 1994, having "stopped the gap" in RAF service for 25 years.

Attempts were made by Blackburn (absorbed into the Hawker Siddeley Group in 1960) to export the Buccaneer. The Federal German Navy expressed interest but eventually succumbed to pressure from the USA to choose the Lockheed F-104 Starfighter instead. However, the South African Air Force (SAAF) chose the Buccaneer and ordered some 30 aircraft during 1962–63.

The South African export variant, the S.50, was essentially an S.2 modified with a Bristol Siddeley BS.605 rocket pack incorporated in the rear fuselage to boost "hot and high" take-off performance. It could also carry bigger underwing tanks. The British Labour government blocked the delivery of the second batch of S.50s, however, and the SAAF only ever received 16 examples. These served until 1992, by which time the numbers had been considerably reduced, but they were very popular with the SAAF.

In summary, the Buccaneer was a complex, demanding — and wonderful — aircraft to fly, perfect for its role of high-speed weapons-delivery at low level, but something of a handful at low speed and in the landing pattern. It could bite if mishandled but was immensely popular with those who flew it, whether at sea, at an airfield in the UK or Germany or from the high veldt in South Africa.

BLACKBURN BUCCANEER S.2 DATA

Powerplant 2 x 11,000lb-static-thrust Rolls-Royce RB.168 Spey turbojet engines

Dimensions		
Span	44ft 0in	(13·4m)
with wings folded	19ft 11in	(6·07m)
Length	63ft 5in	(19·3m)
folded	51ft 10in	(15·79m)
Height	16ft 3in	(4·97m)
Wheel track	11ft 10½in	(3·59m)
Wheelbase	20ft 7½in	(6·29m)
Wing area	514·7ft²	(47·82m²)
Weights		
Empty	29,980lb	(13,600kg)
Loaded	62,000lb	(28,000kg)
Performance		
Maximum speed		
at sea level	690 m.p.h.	(1,100km/h)
Service ceiling	40,000ft	(12,000m)
Range		
"Hi-lo-hi" mission		
radius of action	600 miles	(965km)
Ferry range	2,000 miles	(3,200km)

BELOW ***Perhaps surprisingly, given the type's capabilities as a rugged but highly effective low-level strike fighter, only one export customer, South Africa, selected the Buccaneer for its air arm. Fitted with a pair of BS.605 rocket motors beneath the rear fuselage, the S.50 variant entered service with the South African Air Force in late 1965.***

TAH ARCHIVE

MARKED BY MISFORTUNE

The troubled Breda Ba.65 in Fuerza Aérea de Chile service

In 1936 Chile launched a modernisation programme for its still comparatively young air force. Determined to acquire more modern types than their South American neighbours, the Chileans chose Italy's Breda Ba.65 monoplane fighter. **AMARU TINCOPA** chronicles the Ba.65's procurement by Chile and its subsequent disappointing career with the FACh

BREDA'S Ba.65 was an updated development of its Ba.64 ground-attack/light reconnaissance aircraft. Designed by Antonio Parano and Giuseppe Panzeri for the *Società Italiana Ernesto Breda*, to fulfill the *Regia Aeronautica's* requirement for an *aeroplano di combattimento da assalto* (ground-attack aircraft), the Ba.65, like its predecessor, was a single-seat all-metal low-wing cantilever monoplane taildragger with an aft-retracting main undercarriage. The short, broad wings were fitted with Handley Page-type slats.

The type was also heavily armed compared to its Italian contemporaries, carrying four wing-mounted guns — two 12·7mm (0·5in) and two 7·7mm (0·303in) Breda-SAFAT machine-guns — in addition to an internal bomb bay capable of carrying up to 20 x 10kg (44lb) anti-personnel bombs, plus an additional 1,000kg (2,200lb) of bombs on underwing racks. The prototype, which made its first flight in September 1935, and the initial production batch were powered by a 700 h.p. Gnome-Rhône 14K Mistral Major radial piston engine produced under licence by Isotta-Fraschini in Italy as the K.14.

The Ba.65's Italian operational debut and later use in the 1936–39 Spanish Civil War revealed that, even with increased horsepower, the type was underpowered and difficult to handle, even for experienced pilots. Numerous complaints from Regia Aeronautica crews led to the factory taking action, and, starting with the 82nd aircraft, the equally lacklustre 1,000 h.p. Fiat A.80 RC.41 18-cylinder twin-row radial engine replaced the K.14 as the Ba.65's powerplant.

The type underwent another engine change when Breda chose to fit later production machines with the more powerful Piaggio P.XI R.C.40 14-cylinder engine (also a derivative of the Mistral Major), which could deliver 1,000 h.p. at

One of the FACh's three turret-equipped Ba.65Bis **Tipo Ciles** *is rolled off the production line at Milan, with FACh engineer Raul Barros Alamos walking alongside the fuselage. The aircraft's fin /rudder has been painted blue but is yet to receive its white star insignia. White roundels with "BA" are painted on the undersides of the wings.*

5,000m (16,400ft), driving a Piaggio variable-pitch propeller. The P.XI was also some 100kg (220lb) lighter than the Fiat A.80 and K.14, although ultimately, owing to its poor reliability, this increase in power and reduction in weight proved to be an improvement "on paper" only, as the benefits were marginal. At one point the Regia Aeronautica considered re-engining its remaining Ba.65 fleet with P.XIs, but the meagre performance gains did not justify the investment and the project was quickly discarded. Production of the Ba.65 ceased in July 1939 after 218 aircraft had been produced by Breda and Caproni.

THE CHILEAN ORDER

In early 1936 the *Fuerza Aérea de Chile* (FACh — Chilean Air Force), at this time commanded by Gen Diego Aracena, established a modernisation programme. Accordingly, technical commissions were despatched to various countries to evaluate the most modern aircraft available in each. One such commission, headed by Aracena himself, arrived in Italy in the summer of 1937 and visited a number of factories, where it evaluated machines offered to the FACh by the *Consorzio della Esportazioni Aeronautiche* (Italian Aeronautical Export Corporation). The commission evaluated the Caproni AP.1 ground-attack aircraft, Breda Ba.65 and Fiat CR.32 biplane fighter, all of which were marketed as the best aircraft Italy had to offer at the time.

The Ba.65 was demonstrated to the Chileans as a ground-attack aircraft also capable of performing fighter and interceptor duties, thanks to its high maximum speed (in its single-seater version). The type caught the interest and subsequent favour of Gen Aracena, and, shortly after the evaluation tests were concluded, the other contenders were discarded in favour of the Breda design.

On September 1, 1937, an order for 20 aircraft — 17 single-seaters and three two-seaters — was issued to Breda by the Chilean government. Some sources have claimed that the Chilean decision to favour the Breda design was a result of a desire to obtain modern monoplane fighters, the FACh being numerically inferior to the air arms of its neighbours Argentina and Peru, which were mostly equipped with biplanes. Credit must also be given to Breda's representatives, who managed to convince the Chileans that the purchase of the Ba.65 would kill two birds with one stone.

The FACh issued Breda with a series of specifications to be met, including the fitting of the P.XI engine into its examples and the replacement of the Italian-made Breda-SAFAT machine-guns

ALL PHOTOGRAPHS GERMAN LUER VIA SANTIAGO RIVAS

LEFT ***A line-up of single-seat Chilean Ba.65s at the Breda factory in Milan in the summer of 1938. The aircraft were delivered in a natural-metal finish with fabric surfaces painted with a standard aluminium varnish. Each example was identified with a large number, from 1 to 20, in black on the rear fuselage.***

ABOVE ***With a single-seater in the background, one of the FACh's three turret-equipped Ba.65s has its compass swung at the Breda works in Milan before delivery. Some 25 Ba.65s were acquired by the Royal Iraqi Air Force in 1938, the majority being fitted with the same Type M turret, which significantly hampered the type's performance.***

with Danish Madsen machine-guns of 12·7mm and 7·62mm calibre, the standard then in use by the FACh. The three two-seat machines were fitted with a hydraulically-operated Breda Type M turret equipped with a 7·62mm machine-gun. The turret was heavy and its use cumbersome, so all three were soon converted to single-seat configuration. In addition, Chile's Ba.65s could either carry 20 x 10kg anti-personnel bombs or 4 x 50kg general-purpose bombs in the internal bomb bay located behind the pilot's seat.

A base-model aircraft, serial MM.75156, was chosen for conversion to the Chilean variant, and, after all the changes and modifications had been implemented, the aircraft on the assembly line selected to fulfil the Chilean order were designated Ba.65/65Bis *Tipo Cile* (Type Chile).

FROM BAD . . .

Breda had originally offered to deliver the first two machines in late 1937 (another reliable source states June 1, 1938), but constant delays on the production line, caused mostly by the modifications required by the Chilean commission, meant that the first airframes did not start rolling off the assembly line until the summer of 1938. One of the FACh Ba.65s, c/n 64182, was destroyed during a test flight in Italy on June 2 that year, and was replaced with another drawn from a Regia Aeronautica order.

After their inspection and testing at the factory by Chilean officers 1st Lt Enrique Flores Alvarez and engineer 1st Lt Raul Barros Alamos, who had arrived in Italy in September 1937, the first batch of Ba.65s was transported by sea to Chile and reached Valparaiso on December 14, 1938.

Along with the airframes came a cadre of technical staff to supervise assembly of the aircraft, as well as Breda test pilot Nicola "Titino" Magaldi, who was to perform the test flights before the official handover of the aircraft to the Chileans. (Magaldi was killed in combat with Gloster Gladiators of the RAF's No 80 Sqn over Greece on November 27, 1940.) Assembly of the Ba.65s began immediately, the first airframes being handed over to the FACh in March 1939 and assigned to the newly created *Grupo de Instruccion Avanzada y Ataque No 4* (No 4 Advanced Training & Attack Group) based at El Bosque Air Base, on the outskirts of Santiago, the Chilean capital, where an intensive training process began. The aircraft were assigned identification numerals from 1 to 20, according to their delivery order.

Breda serial No 1, c/n 64179, was the first to be withdrawn from service, after being involved in an accident on June 9, 1939. *Capitano* Magaldi took off from El Bosque to perform a test flight and unintentionally left the *Più Cento* system (the

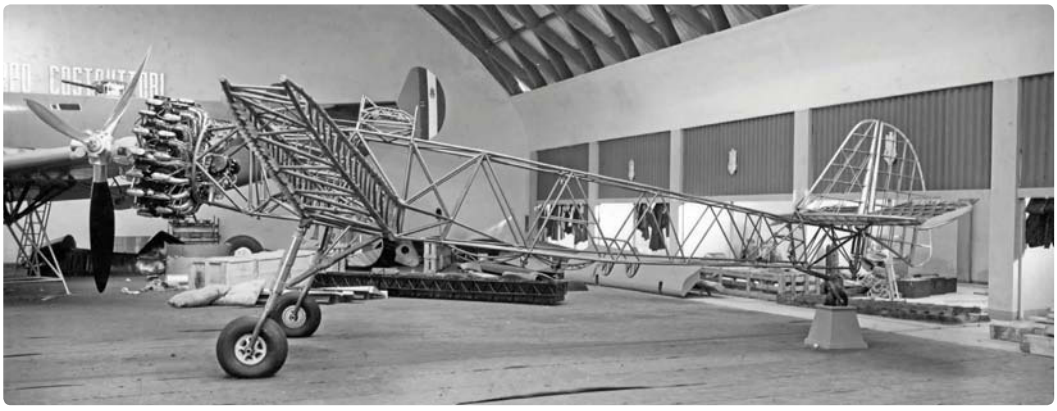
A poor-quality but rare photograph of the Ba.65s at El Bosque Air Base near Santiago during an air force review and parade day held on March 21, 1939, shortly after their entry into service. By this time the aircraft had received white star insignia on their blue-painted rudders, and the FACh's shield insignia on the undersides of the wings.

The Breda Ba.65: Underpowered, overweight – or both?

ITALIAN FIGHTER PILOTS, who tended to judge aircraft in terms of manœuvrability, disliked the Ba.65 for its low power/weight ratio. Changing from the 900 h.p. Gnome-Rhône K.14 to the 1,000 h.p. Fiat A.80 and Piaggio P.XI offered only limited improvement, leading China to specify the 1,200 h.p. Pratt & Whitney R-1830 for local production. But the type also suffered from archaic Breda design philosophy. On both the Ba.65 and Ba.88, the fuselage and wings were welded steel-tube structures, supporting metal frames and ribs covered in sheet aluminium — almost like having one aircraft inside another. As combat in North Africa during 1940–41 demonstrated, this made the type strong but also *very* heavy, further taxing its feeble engine.

The short-term remedy was to remove all unnecessary weight, including the rear turret and gunner. But Breda was aware that the real solution was stressed-skin construction, and in 1938 built a Ba.88 monocoque fuselage, tested to destruction in 1939. By then, the Regia Aeronautica had given up on Breda's own machines and the company opted to build Macchi fighters under licence. **GREGORY ALEGI**

	Ba.65 K.14 (single-seat)	**Ba.65 K.14 (two-seat)**	**Ba.65 A.80 (single-seat)**
Dimensions			
Span	12·1m (39ft 6in)	12·1m (39ft 6in)	11·9m (39ft 0in)
Length	9·53m (31ft 2in)	9·53m (31ft 2in)	9·9m (32ft 4in)
Height	3·2m (10ft 6in)	3·2m (10ft 6in)	3·2m (10ft 6in)
Wing area	23·5m² (253ft²)	23·5m² (253ft²)	—
Weights			
Empty	2,215kg (4,885lb)	2,215kg (4,885lb)	2,500kg (5,510lb)
Loaded	2,765kg (6,096lb)	3,315kg (7,310lb)	3,150kg (6,945lb)
Performance			
Maximum speed at sea level	357km/h (222 m.p.h.)	347km/h (216 m.p.h.)	352km/h (219 m.p.h.)
Normal range	515km (320 miles)	850km (530 miles)	544km (340 miles)



ABOVE ***The aftermath of the accident in which 2nd Lt Traub was killed on September 19, 1939, while participating in a nine-aircraft formation take-off from El Bosque during rehearsals for a parade. The Ba.65 was not an easy type to master, and Traub was insufficiently experienced to cope with the type's idiosyncratic handling characteristics.***

emergency "plus 100 h.p." boost system designed to be used for an absolute maximum period of 10sec) engaged, resulting in catastrophic engine damage. Magaldi made a second error — which could well have cost him his life — when he tried to land the powerless Breda with the undercarriage extended in a nearby field, La Cisterna, north of El Bosque airfield. Coming in too fast, Magaldi made a rough emergency landing and the machine (fitted without a safety "roll-bar" in the cockpit) overturned, the pilot surviving only because the empennage became entangled in telephone wires. After an inspection of the Breda, the FACh accident bureau decreed that the airframe was a total loss. The factory, taking into consideration the circumstances of the accident, offered to send a replacement.

Shortly afterwards, as part of the FACh's preparations for the National Day parade on September 19, 1939, the commander of Grupo No 4 ordered a nine-aircraft formation take-off from El Bosque. At the controls of Ba.65 serial No 17, c/n 64192, was 2nd Lt Traub, the third element of the third formation. The runway was narrow, and during his take-off Traub noticed his port wing getting dangerously close to the adjacent buildings, forcing him to move to starboard. By doing so, he entered the wake left by the leading aircraft. To try and counter the turbulence, Traub applied a bootful of left rudder, putting the Breda into a low-level stall. In a last attempt to regain control, Traub engaged the Più Cento system, which only exacerbated the problem, the Ba.65 crashing beside the doors of the maintenance hangar. The chief culprits in this incident were the pilot's lack of training on type — he had only a few hours on the Ba.65 — and the recklessness of the unit's commander.

. . . TO WORSE

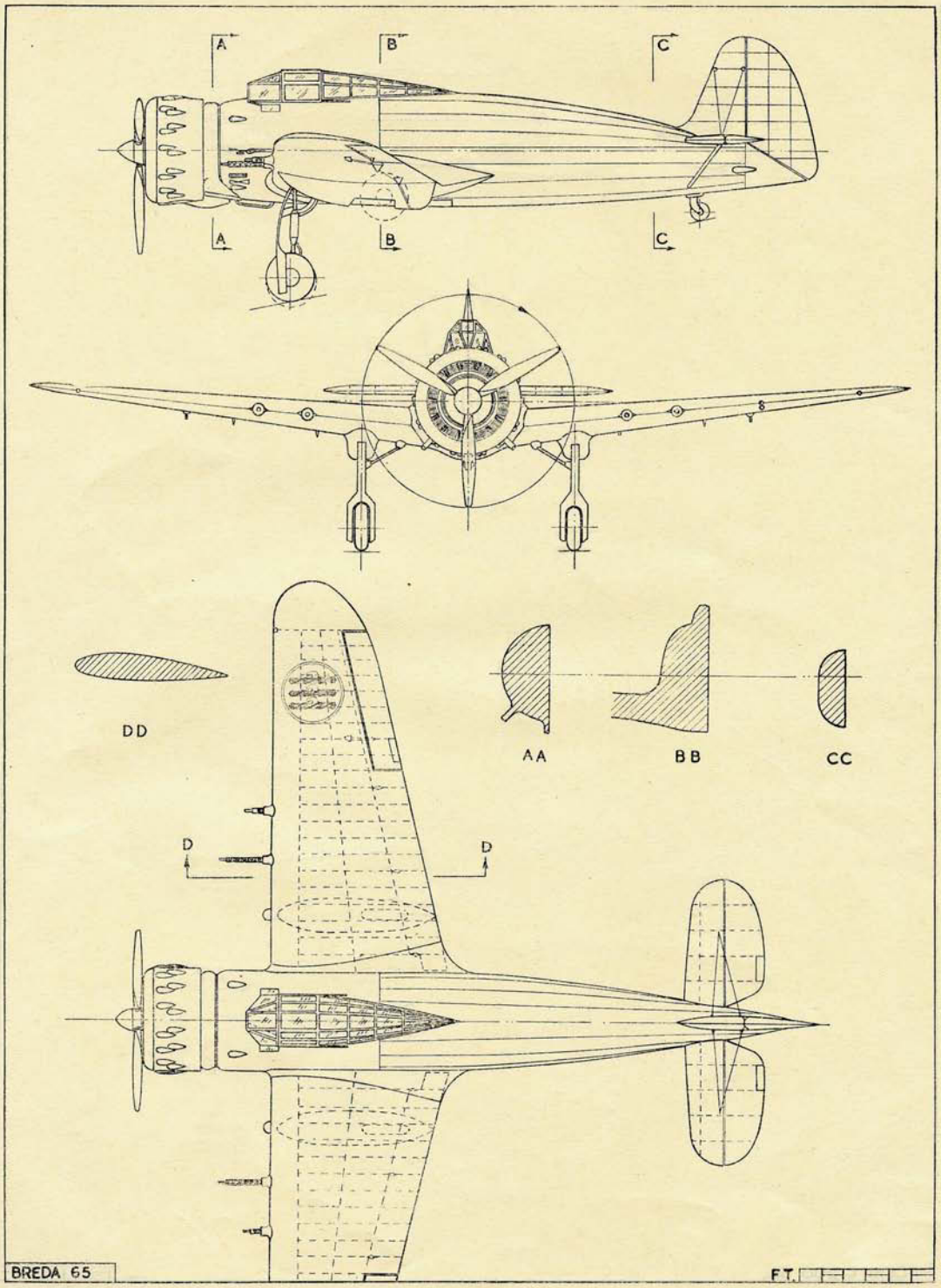
Operations had barely resumed at Grupo No 4 when, on October 31, 1939, during a gunnery practice flight in the vicinity of Maipú, the P.XI engine of Breda No 5 (c/n 64186), flown by Capt Hernán Lopez Angulo, failed. Lopez, a seasoned pilot, kept his cool and performed an emergency landing near a stable near Maipú, and walked away unscathed. The aircraft, however, was written-off after it was burnt out as a result of the engine fire that developed after landing.

The more experienced FACh pilots soon learned the tricks of the Breda, and discovered that, while not pleasant to fly, the Ba.65 was able to perform its duties if given sufficient respect. Aerobatics in the type were restricted, and only the most seasoned pilots were allowed to attempt anything resembling high-energy manœuvres in the heavy Breda. There were numerous flights to the interior of the country, where the type was tested and evaluated under various conditions.

The Ba.65's engine was started with the aid of a small compressor, located in the port wing, which provided pressurised air to the cylinders, pushing the rods which in turn rotated the propeller. Once

The Breda Ba.65

Although similar in layout to the Ba.64, from which it was developed, the Ba.65 had a fuller fuselage, and a sliding canopy replaced the open cockpit. Three of the Chilean examples were fitted with Breda Type M turrets, but the other 17 of the FACh's 20 examples were single-seat versions, as in this* Aeromodeller *three-view.



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ABOVE ***The charred remains of Ba.65 No 5 (c/n 64186), which came to grief after engine failure during a gunnery practice flight on October 31, 1939. Thankfully, the pilot, Capt Hernán Lopez Angulo, was one of the more experienced FACh pilots and managed to execute a skilful forced landing in a field at Maipú, near El Bosque AB. The aircraft was destroyed in the ensuing fire, however.***

LEFT & BELOW ***An all-too-familiar sight by the end of 1939, the wreckage of yet another crashed Ba.65 is surveyed by locals after 2nd Lt Ramón Ortiz was killed in the crash of Ba.65 No 15 on November 3 that year. Ortiz, again an inexperienced pilot, got into trouble after an aborted landing at El Bosque and stalled, the resulting impact with the ground tearing the engine from its mounting.***

ABOVE ***The somewhat cramped cockpit of the Ba.65. The control column, fitted with a spade grip, was equipped with a central lever for the compressed-air system that operated the undercarriage and weapons bay doors, and the smaller levers placed either side of the central lever were the firing buttons for the four wing-mounted guns.***

the engine reached the required revolutions, the battery was engaged and the engine was started. During take-off the Ba.65 experienced a notable torque-generated pull to starboard, which had to be compensated for by the pilot applying full left rudder. Also, during dives the aircraft gained speed very quickly, the pilot having to use all his strength to recover full control. The type's reported maximum speed was 475km/h (295 m.p.h.), at least according to the factory brochure, but it is widely known that not a single FACh pilot ever reached that figure in the aircraft.

Another concern for the FACh's Breda pilots was the type's troublesome (and dangerous) pneumatic brake system, which had no emergency valve to purge the excess air produced by the engine's compressor. As a result, the pilot had constantly to check the manometer on the instrument panel to avoid exceeding the pressure in the tank and blowing the seal, which would result in no pressure for the operation of the armament, or worse, the braking system.

Another accident, this time with fatal consequences, occurred on November 3, 1939, when 2nd Lt Ramón Ortiz, a classmate of 2nd Lt Traub, crashed while landing at El Bosque. At the controls of Breda No 15, Ortiz performed a poor landing approach and overran the runway. Pushing the throttle forward, he started a turn to starboard but, owing to his inexperience (he had only flown the Avro 626 biplane trainer with a fixed undercarriage before being assigned to fly the more demanding Breda), forgot to raise the flaps and retract the undercarriage, which put the aircraft into a stall before it crashed on agricultural land beside the airfield.

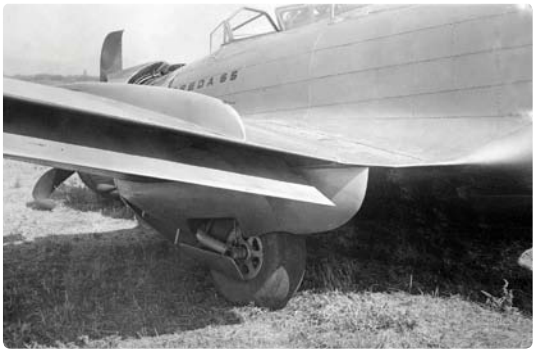
Most of these incidents and accidents were not necessarily directly attributable to the aircraft itself, but rather to the insufficient training provided to its pilots. They were, however, a cause of great indignation among the population, who demanded explanations from the authorities. Despite the facts, the FACh High Command was reluctant to accept that it was a training issue rather than an aircraft problem, and in early 1940 the Ba.65s were grounded pending "a thorough investigation in search of solutions".

In the meantime, the FACh realised that perhaps the Breda was not its best bet, and in the spring of 1940 the Chilean government negotiated with Italy about the possibility of returning the remaining aircraft in exchange for a batch of Fiat CR.32 biplane fighters instead — a proposal that collapsed upon Italy's entrance into the war in Europe, in which the Italians would have little use for the cumbersome Breda.

LOOKING TO AMERICA

A better solution for the Chileans was to establish a United States Military Mission, fostered by the goodwill engendered in the wake of the Rio Conference in January 1942, in which the Pan-American nations agreed on conditions to present a united wartime front. This would allow

Breda Ba.65 No 10 was arguably the unluckiest of the FACh examples, experiencing a number of mishaps during its operational career, including this forced landing after hydraulic failure in November 1941. Although the variable-pitch propeller was destroyed, the airframe suffered only minimal damage.



LEFT ***The collapsed port undercarriage leg of No 10 after its forced landing in November 1941. Fortunately, the pilot was unharmed and the aircraft was repaired and returned to operational status. After Italy's entry into the war in Europe in June 1940 the availability of spares for Chile's Italian aircraft began to dwindle, and it became increasingly difficult to keep the Ba.65s serviceable and operational.***

BELOW ***Four months after its undercarriage mishap, No 10 was hobbled again when its pilot failed to follow the correct procedure to lower the undercarriage during a flight on March 20, 1942. This time the damage was more serious, the starboard wing taking the brunt of the crash; with the wing's spars damaged beyond repair, the aircraft was written off.***

Officers of the FACh give members of the US Military Mission to Chile a review of the types then in service with the air arm at Los Cerrillos, Santiago, including a pair of Ba.65s and one of the six Arado Ar 95B biplanes delivered to Chile before the outbreak of the war in Europe.

for the arrival of modern aircraft from the USA in which to train FACh pilots, who until that time had graduated on the Avro 626. Shortly after the signing of an agreement with the USA, North American T-6 Texans began to arrive in Chile.

One of the US Mission's assigned instructors, Col Omer Niegarth, was introduced to the Breda and, at the request of the FACh authorities, took one aloft in order to determine whether the type could still be useful to the FACh. After a 30min flight Niegarth found the flying characteristics of the aircraft satisfactory, but recommended its use only by pilots previously trained on the T-6.

Italy's entry into the war, which made it impossible to obtain spare parts and essential supplies for the operation of the aircraft, only accelerated the end of the Ba.65's FACh career. One of the first supplies to run out was the Castrol motor oil needed for the Piaggio engines, and for which there was no substitute in Chile. Grupo No 4 mechanics tried, unsuccessfully, to replace it with the synthetic oil used by other FACh aircraft.

Another Breda was lost during this period and on March 20, 1942, Ba.65 No 10 was damaged beyond repair when its pilot failed to extend the undercarriage fully before landing, causing damage to the undercarriage and wing spars.

One by one the remaining Bredas were grounded, No 13 being the last of the type to fly in Chile, with Lt Gaston Carrere at the controls, in the spring of 1942, thus ending the blighted history of the Ba.65 with the FACh. Shortly afterwards the Chileans replaced the little-loved Italian aircraft with more modern types acquired through Lend-Lease arrangements under the auspices of the Military Assistance Program signed with the USA.

AMARU TINCOPA

ABOVE ***The only surviving relic of Chile's somewhat unsatisfactory relationship with the Ba.65 is this original Breda Type M turret and machine-gun, as briefly fitted to the FACh's three examples of the Ba.65Bis. It is kept on display at the*** **Museo Nacional Aeronáutico y del Espacio** ***(National Aeronautical & Space Museum) in the capital, Santiago de Chile.***

ACKNOWLEDGMENTS *The Editor would like to thank Gregory Alegi for his invaluable assistance with the preparation of this feature*

BAMBOO BIRDS & OTHER RARE SPECIES

INDIGENOUS AIRCRAFT DESIGN IN THE PHILIPPINES, 1951–58

Although aviation gained a foothold in the Philippines as far back as 1911, the nation never managed to develop an aircraft industry based on its own homegrown designs. A number of aircraft conceived specifically to investigate the incorporation of local materials in aircraft manufacture were built and flown during the 1950s, however, as **NICK STROUD** explains

Nicknamed "the Flying Basket" owing to its woven-bamboo construction, the sole PAF-IST XL-14 Maya, bearing its experimental category registration PI-X-104 on its fins, taxies out for a test flight circa early 1953. The machine was a co-operative materials-research project developed by the Institute of Science & Technology (IST) and the Philippine Air Force (PAF).

ALL PHOTOGRAPHS BY HOWARD LEVY

NOT GENERALLY RENOWNED for its aeronautical endeavours, the Philippines can nevertheless claim south-east Asia's earliest encounter with manned powered flight, when American aviator James C. "Bud" Mars thrilled spectators in his Skylark pusher biplane (a modified Curtiss design) at the Manila Carnival on February 21, 1911. Mars was part of a Pacific Aviation Exhibition tour organised by fellow American Capt Thomas Baldwin, who followed Mars's Skylark display at the Carnival with a demonstration of his own Baldwin Red Devil, the pair having arrived with their dismantled aircraft aboard a steamer from Hawaii ten days previously.

The exhibition had not gone so well in Hawaii, where the locals had quickly established a principle that has caused headaches for airshow organisers ever since; why pay for a ticket to enter the showground when you can see an air display from any nearby vantage point? The Manila Carnival organisers must have found a way to sidestep this issue, as the pair of aviators made numerous flights during the week-long festival. Baldwin sold his machine before the duo moved on to complete the Pacific tour with visits to Thailand, Hong Kong and Japan. (The Red Devil was later used by the first flight school in the Philippines, opened by Lt Frank Lahm of the US Army Signal Corps in March 1912. On the 21st of that month Lahm became the first military pilot in the Philippines to fly a military aircraft, when he flew an imported Signal Corps Wright Model B from the capital's polo field.)

A replica of the Mars Skylark built by students at the Philippine Air Transport & Training Services College of Aeronautics in 2011 now hangs in the Philippine Air Force Museum at Villamor Air Base near Manila.

THE EARLY YEARS

Since 1898 the Philippines had been under the administration of the USA; and, eight years after Mars and Baldwin's historic adventures at the Manila Carnival, the Curtiss Aeroplane & Motor Co opened a branch in Manila in the autumn of 1919, from which two former US Army pilots, Maj Joseph Stevenot and Capt Alfred Croft, operated a Curtiss Jenny and a Curtiss Seagull flying-boat. The pair carried the first air mail in the Philippines, from Manila to Cebu and Iloilo, on November 29 that year.

At around the same time, a young pilot from Iloilo, José Tinsay — who had learned to fly in the USA and acquired a Curtiss Oriole — began charter flights across the Guimaras Strait that separates Iloilo on the island of Panay with the thriving town of Bacolod on the neighbouring island of Negros. Aviation was beginning to take a foothold in the Philippines, in both commercial and military terms, and the first Filipino military pilot to qualify to fly was Lt Leonicio Malinao of the Philippine National Guard Aviation Unit, who soloed in a Curtiss JN-4 Jenny on April 20, 1920. By the mid-1930s the Philippine Constabulary had established an aviation branch, mainly using Stearman Models 73 and 76 biplanes and 1917-vintage Curtiss Jennies to locate bandit hideouts.

A number of fledgling airlines had also spread

OPPOSITE PAGE, TOP ***Although not the most elegant of designs, the XL-15 Tagak was the third of the PAF-IST's collaborative efforts, and offered a rugged, capacious aircraft made with locally-sourced materials.*** **OPPOSITE PAGE, BOTTOM** ***Looking like a Cessna O-1 Bird Dog with twin fins, the Maya prepares to alight after a test flight.***

LEFT ***The Maya under construction in Manila. The fuselage was of semi-monocoque structure with wooden stringers and covered with Wobex, the experimental woven-bamboo material made from locally-sourced supplies of the grass.***

BELOW ***Final adjustments are made to the complete XL-14 at Manila before its first flight, which some sources state was in December 1952, although there appears to be no definitive information on an exact date, and it may have been early 1953.***

their wings, mostly with the help of American investors. All, including the Philippine Aerial Taxi Co (PATCo) and the Iloilo–Negros Air Express Co (INAEC), used a variety of American designs, including Stinsons, Wacos and even a Sikorsky S-43 flying-boat in the case of INAEC.

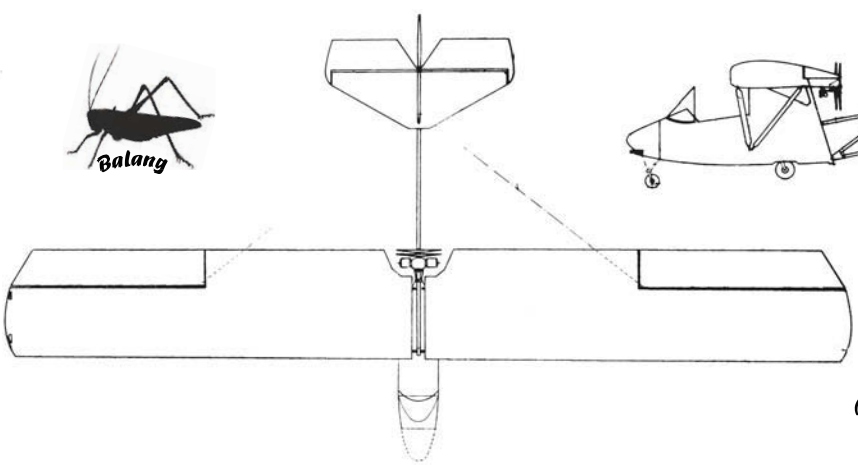
The first known venture into homegrown aircraft manufacture in the Philippines was the Snipe low-wing monoplane of 1938, designed and built by Dr Gregorio Y. Zara, an important figure in the history of aviation and engineering in the Philippines. Zara had studied in the USA at the Massachusetts Institute of Technology, where he acquired a degree in mechanical engineering, and the University of Michigan, where he graduated with a Masters degree in aeronautical engineering. On his return to the Philippines Zara became chief of the aeronautical division of the Department of Public Works & Communications, and in 1936 was appointed chief aeronautical engineer for the Bureau of Aeronautics, part of the Department of National Defense. He also taught aeronautics at the Valeriano Aviation School, American Far Eastern School of Aviation and Far Eastern University.

Designed by Zara and built by the Philippine Aircraft Corporation (established by US Army Air Corps mechanic and pilot Raoul Messier in 1935), the Snipe was powered by an 85 h.p. LeBlond five-cylinder radial engine and was awarded Philippine Aircraft Type Certificate No 1 by the Bureau of Aeronautics. The Snipe was flown regularly and served with the Philippine Army Air Corps (established in 1936) until early 1942, when it was shot down by aircraft of the invading Japanese forces.

INSPIRATION & EXPERIMENTATION

The Second World War put paid to any further development of indigenous aircraft in the Philippines for the duration, and the establishment of the nation as an independent republic was declared in July 1946. The Philippine Air Force (PAF) became an independent military service exactly a year later, and was equipped exclusively with American types, the Philippines signing a 99-year mutual defence treaty with the USA in 1951.

Established as part of the burgeoning nation's technological and educational infrastructure, the



The XL-10 Balang was a simple powered glider with a span of 39ft 4in (12m) and a length of 20ft 4in (6·2m). It was completed and flown, although exactly when the first flight was made (probably the occasion of the photograph* BELOW*), remains unconfirmed.

Institute of Science & Technology (IST) enlisted the co-operation of the PAF to investigate the country's prospects for local aircraft design and production, and to examine the use of indigenous materials in their construction. One of the latter was Wobex, an experimental reinforced woven bamboo material. Accordingly, the IST's Aircraft Research & Development Unit, under the leadership of Dr Joaquin Marañon, was given the task of designing a light single-engined aircraft that incorporated a high percentage of Wobex in its construction, under the supervision of the PAF in Manila.

The guiding hand behind the IST's design department was Antonio J. de Leon, who had received his aeronautical training at the Polytechnical Institute of Budapest in Hungary and the *Technische Hochschule Charlottenburg* in Berlin. With a 100 h.p. Lycoming O-235 four-cylinder horizontally-opposed air-cooled piston engine to start with and a brief to explore the use of Wobex, de Leon set to work on the first of the PAF-IST's experimental prototypes, designated the XL-14 Maya (the national bird of the Philippines). Wobex, developed by de Leon, consisted of diagonally woven strips of thin bamboo made airtight, leakproof and smooth by application of fine sawdust and epoxy to the outer surface. Wooden components were to be made of lauan, a light locally-grown wood, also known as shorea or Philippine mahogany.

The resulting aircraft was a high-wing monoplane of standard configuration except for the incorporation of a strut-braced twin-tail with rectangular endplate fins and rudders. The main wing was of constant chord and built around two parallel solid spars and wooden ribs made from lauan. The leading edges of the wings were covered and reinforced with Wobex while the remainder of the wing was fabric-covered.

The Maya's fuselage was of semi-monocoque construction with wooden stringers and Wobex mat covering. The cockpit and cabin stood proud of the rear fuselage, which tapered to the twin-fin tail, the structure of which was wooden with fabric covering. The cabin incorporated side-by-side seating forward of a modest luggage area, which could be fitted with a third seat. The undercarriage was of conventional taildragger configuration, with each mainwheel mounted on V-struts and half-axles hinged to the fuselage underside by means of rubber shock absorbers. The non-retractable tailwheel was steerable.

The sole XL-14, dubbed "The Flying Basket", made its maiden flight in the hands of renowned American INAEC pilot Henry W. Meider in late 1952 or early 1953. Although little appears to be known about its handling or the efficacy of its construction, it was described as being suitable for agricultural use and for utility and observation work. Only one example was built, however, the PAF-IST moving on to other projects.

THE LOCUST AND THE SWAN

Developed concurrently with the Maya was the XL-10 Balang (Locust), a powered glider developed with an eye on the private flying club market. It was constructed of wood, plywood and fabric, but it is not clear whether the Balang incorporated Wobex in its structure. The tricycle-configured machine comprised a forward fuselage cockpit pod, attached to which were

ABOVE ***The XL-15 Tagak was completed in 1954 and made its first flight late that year. It was modified during 1955–56 to provide increased rudder area and a shimmy-damper in the nosewheel undercarriage.***

LEFT ***The aft end of the Tagak's main fuselage pod was extensively glazed, the type being conceived as an air ambulance and liaison aircraft, although it is unlikely it was ever intended to be put into production as such; it was essentially another Wobex-research design.***

BELOW LEFT ***The glazed rear door of the Tagak's fuselage pod was hinged on the starboard side and opened to provide access to the 10ft 6in (3·3m)-long and 3ft 1½in (0·96m)-wide cabin, which could accommodate up to two stretchers, one on top of the other, plus a medical attendant beside the pilot.***

BELOW ***The XL-15's cockpit layout was somewhat spartan, with only the most basic instrumentation provided for the test-flight programme. The Tagak was fitted with a Lycoming O-425 six-cylinder engine driving a fixed-pitch two-bladed propeller.***

ABOVE ***Conceived as a light touring and training aircraft, the L-17 Musang was a departure for the PAF-IST design team in that it sported a low wing and did not incorporate the use of Wobex. Making its maiden flight in October 1956, the Musang did not go into production; and, like its PAF-IST stablemates, only one example was built.***

wings of constant chord with elliptical tips, the aft fuselage comprising a single narrow braced frame leading to the single fin and tailplane. The wings and tail area were fabric-covered and the forward fuselage was enclosed in plywood, but the nosecone comprised a single-piece metal unit. The small auxiliary pusher engine was fitted with tandem two-bladed propellers and the fuel tank was located in the central section aft of the cockpit. Again, little is known about its flight trials or ultimate fate, although it is thought that it was the sole example.

The PAF-IST's next venture, the XL-15 Tagak (Swan), was a single-engined high-wing monoplane with an unusual twin-boom configuration and tricycle undercarriage. This enabled easy access to the heavily-glazed aft end of the fuselage pod, which was fitted with a large swinging door for easy access in the ambulance role. The inner wing sections were of constant chord and fitted with slotted flaps on the trailing edges, the outer wing sections tapering and being fitted with slotted ailerons. The wing was braced with a single lift strut on each side, the strut being of aerofoil profile to provide an element of lift.

Another experiment with the use of Wobex, the Tagak's fuselage pod was a wood and plywood-framed monocoque structure skinned with Wobex and plywood. The booms, of all-plywood construction, were integral to the wing centre section, and the fins, incorporating long-chord underside fillets for stability, were integral with the booms. The rectangular tailplane extended beyond the twin fins and the elevator was fitted with a horn balance. The cabin measured 10ft 6in (3·25m) from the firewall of the 185 h.p. Lycoming O-425 engine to its aftmost end. The control surfaces were fabric-covered.

As with the Maya, there appears to be no information on the exact date for the aircraft's first flight, but it is thought to be around October 1954, with flight trials continuing through 1954–56. Again, only one was built.

THE CAT AND THE SAILING-BOAT

Whether Wobex was deemed a success or not remains something of a mystery, but the next PAF-IST experimental prototype reverted to a concentration on construction using local timber sources rather than the seemingly strong but notoriously inconsistent bamboo — a grass rather than a wood. The L-17 Musang (Civet) was a side-by-side two-seat low-wing single-engined monoplane designed as a training and touring aircraft, powered by a 110 h.p. Lycoming O-235-C1 four-cylinder air-cooled piston engine driving a fixed-pitch two-bladed laminated propeller reportedly developed by Gregorio Zara at the IST.

The Musang's straight-tapered wing was a single-piece wooden structure with 5° dihedral employing a USA 35B aerofoil section at the root and NACA 23012 at the tip (as used on the Tagak). The wing structure was of wood with a box-type main spar, covered with plywood topped with fabric and incorporating split flaps inboard of the ailerons.

The fuselage was again of semi-monocoque construction with wooden bulkheads and stringers and was plywood-skinned with a fabric outer wrap. The tail, of all-wood cantilever type, incorporated a tall slightly swept fin, the bottom of the horn-balanced rudder terminating just above the elevator and just aft of its hinge, with a small cutout to allow for elevator deflection. The

PHILIPPINE AIR FORCE-INSTITUTE OF SCIENCE & TECHNOLOGY AIRCRAFT DATA

	XL-14 Maya	XL-15 Tagak	L-17 Musang
Dimensions			
Span	33ft 6in (10·24m)	39ft 5in (12m)	31ft 6in (9·6m)
Length	20ft 8in (6·3m)	30ft 0in (9·15m)	23ft 7in (7·2m)
Height	—	9ft 3in (2·8m)	10ft 6in (3·2m)
tail up	7ft 11in (2·4m)	—	—
tail down	7ft 6in (2·3m)	—	—
Wing area	172·2ft² (16m²)	218·4ft² (20·3m²)	144·2ft² (13·4m²)
Weights			
Empty	1,125lb (510kg)	1,716lb (780kg)	1,124lb (510kg)
Loaded	1,720lb (780kg)	2,750lb (1,250kg)	1,620lb (735kg)
Wing loading	10lb/ft² (48·75kg/m²)	12·6lb/ft² (61·5kg/m²)	—
Power loading	17·2lb/h.p. (7·8kg/h.p.)	14·51lb/h.p. (6·58kg/h.p.)	—
Performance			
Maximum speed	115 m.p.h. (185km/h)	124 m.p.h. (200km/h)	130 m.p.h. (210km/h)
Cruising speed	95 m.p.h. (152km/h)	98 m.p.h. (158km/h)	109 m.p.h. (175km/h)
Landing speed with flaps	45 m.p.h. (72km/h)	47 m.p.h. (76km/h)	50 m.p.h. (80km/h)
Normal take-off distance	1,150ft (350m)	1,179ft (360m)	—
Climb	708ft/min (216m/min)	590ft/min (180m/min)	755ft/min (230m/min)
Service ceiling	12,500ft (3,800m)	13,120ft (4,000m)	—
Normal range	300 miles (480km)	420 miles (675km)	—

straight-tapered rather high-set tailplane was situated at the very top edge of the aft fuselage. The movable tail surfaces had plywood leading edges and fabric covering. The fixed tricycle undercarriage had rearward-sloping oleo legs mounted to the wings, the undercarriage of 7ft 10in (2·4m) track incorporating a steerable nosewheel, oleo-pneumatic shocks and low-pressure tyres for use on rugged airfields.

The Musang was completed in October 1956 and made its maiden flight the same month, although it appears that the aircraft required some modification after a number of early test flights; *Jane's All The World's Aircraft 1959–60* states that the type had been "due to resume flight tests in 1958, after further modification".

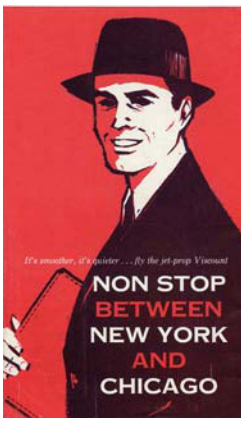
The last of the PAF-IST Research & Development Unit's 1950s prototypes was the L-21S Flying Vinta (a vinta is a traditional sailing-boat from the Philippine island of Mindanao). This was a development of the XL-15 Tagak, again intended for ambulance/utility work or for air-sea rescue duties when fitted with twin floats. The twin-boom concept was replaced with a more conventional fuselage shape, although the aft loading idea was retained, in a configuration similar to that of the Edgar Percival E.P.9.

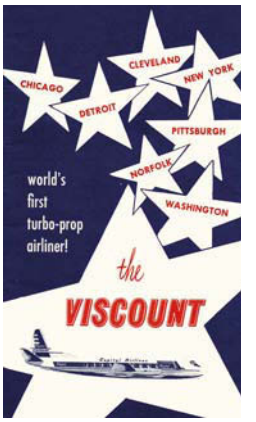
Larger than its forerunner, the L-21S was to be powered by a single 225 h.p. Continental O-470-B six-cylinder horizontally opposed air-cooled piston engine driving a two-bladed fixed-pitch wooden propeller. The design was to accommodate four passengers, two side-by-side in tandem, or one or two stretchers with pilot and attendant. In the pure utility role, there was sufficient area to carry 550lb (250kg) of cargo. The single-strut-braced high wing employed a Boeing 106 aerofoil and comprised a centre section integral with the fuselage, plus two outer panels of constant chord and thickness in rectangular planform. Wobex had apparently fallen completely out of favour by this time as the aircraft was to be manufactured from wood, presumably lauan, with a fabric covering.

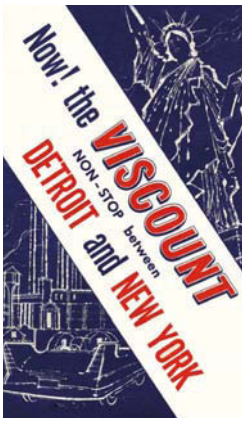
THE MENAGERIE CLOSES ITS DOORS

In 1958 the organisation of the IST was restructured and the R&D Unit was ordered to stop work before the L-21S was completed. Between October 1951, when the PAF-IST R&D Unit was established, and its demise in 1958, five aircraft were designed and four built and flown, using only locally produced materials for the most part. Although none went beyond the prototype stage, the information gleaned from the organisation's 1950s endeavours stood the nation's nascent aerospace industry in good stead for later developments, including the licence manufacture of Messerschmitt-Bölkow-Blohm Bo 105 helicopters from 1973 and Britten-Norman Islanders from 1976.

All is not so rosy today, however, as the state-owned Philippine Aerospace Development Corp, established in 1973, is currently scheduled for closure after having failed to develop a single useful indigenous aircraft over 45 years of operation — a poor reflection on the sterling efforts of the PAF-IST to develop its own menagerie of homegrown birds, insects and other rare species during the 1950s.





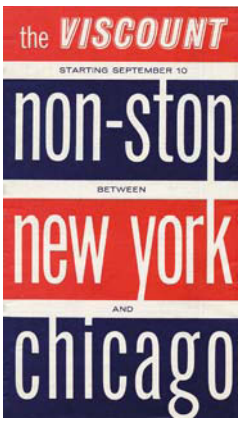


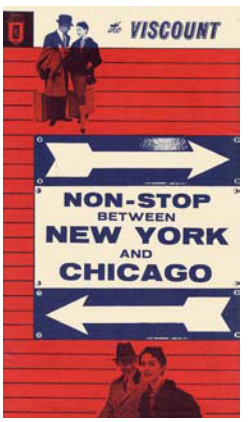
THE VISCOUNT COMES TO AMERICA

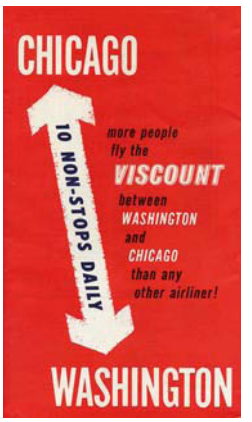
PART ONE

Capital AIRLINES

DAVID H. STRINGER introduces a new three-part series detailing the trio of American operators — Capital, Continental and Northeast — who saw the early potential of the world's first turboprop airliner and took the bold decision to "buy British" at a time when the USA led the world in airliner design







The Viscount entered service with Capital Airlines in July 1955, supplementing the company's fleet of Douglas DC-3s, DC-4s and elderly Lockheed Constellations. At a stroke, Capital became the standard-setter for airlines in the USA, having acquired a cutting-edge aircraft type that had the flexibility to operate profitably over a varied network.

ZOGGAVIA

ONE OF THE "grande dames" of Washington DC hotels, The Mayflower has hosted politicians, celebrities and the movers and shakers of business and industry for more than a century. On the evening of March 29, 1957, James H. "Slim" Carmichael was guest of honour at the Washington Dinner of the Newcomen Society in North America, held in The Mayflower's Grand Ballroom. Carmichael, President of Washington-based Capital Airlines, delivered an address to the assembled members of the corporate history organisation. The title of his presentation was "A Distinguished Briton in American Skies! The Viscounts".

Capital was the first of the American airlines to operate a turboprop-powered aircraft — the British-designed and -built Vickers Viscount, which it had introduced to its passengers in June 1955. By the time Carmichael gave his speech at The Mayflower, the company was employing 57 examples of the type on routes throughout the eastern USA. As a result of the lavish media campaign introducing Capital's new aircraft to the American public, the whistling jet-prop from England was firmly associated with Carmichael's airline and vice-versa.

In the spring of 1957 the advent of the true jet age for commercial airlines was still a year and a half in the future, when Pan American and BOAC would launch Boeing 707 and de Havilland Comet 4 services respectively, in October 1958. The initial foray into commercial turbojet service with the Comet I had been suspended in 1954 after a series of accidents had revealed the need to incorporate substantial design changes. Consequently, for almost two years before his presentation to the Newcomen Society, Carmichael's Capital had been a step ahead of every other airline in the USA in its choice of flight equipment.

Capital Airlines was the result of a 1936 merger between Pennsylvania Airlines and Central Airlines. The merged company was known as Pennsylvania Central Airlines (PCA) until after the Second World War, when the name of the outfit was changed to Capital Airlines.

The President of PCA was C. Bedell Monro, formerly the chief executive of Pennsylvania Airlines. During the war he had committed some of the company's resources to the study of constructing seadromes — airports on floating islands in the Atlantic Ocean, located at 800-mile (1,300km) intervals, south of the "great circle" route that stretches from the USA to Europe via Newfoundland, Iceland or Greenland to Scandinavia or the UK. These airport islands were to accommodate PCA's aircraft flying trans-oceanic services after the war. By 1946, however, Douglas DC-4s and Lockheed Constellations were making regular transatlantic flights, refuelling at airports comfortably situated on terra firma. It was a moot point for Monro's company anyway, as the Civil Aeronautics Board (CAB) denied all of PCA's applications for international routes.

CAPITAL INTO BUSINESS

With America's post-war economy facing bright prospects, Monro's newly-minted Capital Airlines ordered 50 twin-piston-engined 36-passenger Martin 2-0-2s to serve the company's network of short- and medium-haul routes, which extended south to Birmingham, Alabama, west to Chicago, Illinois, and north to Sault Ste Marie, Michigan, serving many cities in between. After the initial post-war boom, traffic subsided to normal levels and, like many other airlines, Capital found itself in financial trouble. Systemwide load factors dropped from 82 per cent in 1945 to 54 per cent in 1947. The order for the Martins was cancelled, as was a proposed merger with Boston-based Northeast Airlines.

PHILIP JARRETT COLLECTION

LEFT ***Capital's President, J.H. "Slim" Carmichael (right) discusses the merits of the Viscount and its Dart engines with Vickers-Armstrongs Aircraft Division's Managing Director George Edwards at Weybridge during Carmichael's fact-finding mission to the UK in 1953.***

BELOW ***At the time of Carmichael's visit, Capital was looking to update its ageing fleet of piston-engined airliners, including DC-4s, which the airline cannily disguised as more modern DC-6s (which had rectangular cabin windows) by painting black rectangles, trimmed with white lines, around the former's windows, as seen here on DC-4 N88745*** **Capitaliner Charleston** ***at O'Hare Airport.***

The company's largest creditor, Chase National Bank, insisted on a change of leadership. Slim Carmichael, who had been chief pilot, operations manager and, most recently, vice-president, took over as Capital's chief executive officer. Monro remained on the board of directors.

Carmichael swiftly turned the airline around. He slashed costs and reduced employee headcount. In 1948 his company made history by being the first certificated carrier in the USA to offer domestic scheduled air-coach flights. The coach concept had been initiated by the non-scheduled airlines that sprang up after the war *[see the author's two-part article on the "non-skeds" in* TAH9 *and* TAH10 *— Ed.]* With the CAB's permission, Capital used its standard DC-4 aircraft, which served on first-class flights during the day, to operate reduced-fare no-frills trips between New York and Chicago via Pittsburgh in the middle of the night. Dubbed "The Nighthawk", the service was an immediate hit with customers. Nighthawk flights were extended over more of Capital's routes and coach-class was copied by other airlines until it developed into the mainstay of passenger service that we know today.

Carmichael took a somewhat conservative approach to fleet development. While other carriers were buying modern factory-fresh aircraft, Capital continued to carry its customers aboard unpressurised DC-3s and DC-4s. The airline famously painted black rectangles trimmed with thin white lines around the circular windows of its DC-4s to make the old Skymasters look like modern DC-6s.

Capital finally acquired pressurised aircraft in 1950, when the company purchased five used Constellations from Lockheed. Three were L-049s traded in by KLM and the other two were ex-military C-69s. All five were refurbished to the same L-049 standard, which included a lounge area at the front of the aircraft, accessed through clear plastic doors etched with the legend "Capital Cloud Club". The company later purchased seven more ex-KLM Constellations, all L-749As, which Capital traded to BOAC in exchange for the latter's L-049s. Both airlines had

JIM SHAUGHNESSY VIA GEORGE HAMLIN

TAH ARCHIVE

ABOVE ***In the summer of 1954 the prototype Viscount V.700, G-AMAV, which had participated in the London to New Zealand Air Race the previous October, was painted in a Capital scheme to enable the airline to make the promotional film*** **A New Concept in Flight.** ***The scheme ultimately adopted for Capital's Viscounts had the hawk motif further forward on the fuselage.***

the two different models in their fleets and, after the swap, Capital had a total of 12 L-049s while BOAC's Constellation fleet was standardised with L-749As.

Capital made one more aircraft choice in 1950. It became the only airline to experiment with the Super DC-3. Three 1936-vintage DC-3s were converted for Capital by Douglas into stretched 31-seat aircraft sporting a tall squared-off fin, squared-off wingtips, integral boarding stairs and mainwheel doors. More powerful Wright Cyclone R-1820-C9HE engines gave the modified DC-3s a cruising speed of 230 m.p.h. (370km/h). The "Super Threes" proved uneconomical to operate, however, and were sold in 1952.

Capital's fleet in 1954 consisted of 25 DC-3s and 25 DC-4s (all unpressurised) plus 12 ageing first-generation Constellations. This was something of an embarrassment for the company that was by this time the fifth largest domestic airline in the USA in terms of passengers carried, surpassed only by the "Big Four" — American, Eastern, United and TWA. Capital's fleet needed not only some new aircraft, it needed a makeover. And it was about to get one.

SELECTING THE VISCOUNT

Capital's needs were unique. Although it was the nation's fifth largest airline, its route network was concentrated east of the Mississippi, so there were no transcontinental long-haul routes. It also did not serve the winter tourist market of Florida, except through an interchange agreement with National Airlines (see the author's *Ted Baker & National Airlines* in *TAH18*). The company connected several big city pairs, but the average stage length was less than 300 miles (480km). Capital's most prestigious "bread-and-butter" route at the time was its non-stop service between Washington DC (National) and Chicago (Midway), a distance of 600 miles (970km). Much of its revenue came from shorter hops in the industrial north-east (later known as the "Rust Belt") between big city pairs like New York—Cleveland, Chicago—Detroit, and Washington DC—Pittsburgh. Added to that was a network of short "puddle-jumper" routes. Capital was required to provide service to more than a dozen places, such as Clarksburg in West Virginia, Rocky Mount in North Carolina and Williamsport in Pennsylvania, that would have been better served by a local service carrier (see the author's two-part article on the locals in *TAH3* and *TAH4*).

American manufacturers Lockheed, Douglas and Boeing were designing and building long-haul aircraft that were not suitable for Capital's average stage length. This left the airline studying the twin-piston-engined products of Convair and Martin, which would not be competitive in Capital's main markets, in which customers would expect to fly on a four-engined airliner. So, the company looked overseas.

For a major American airline to consider purchasing a foreign-built aircraft was unprecedented; the Fokkers used by some pre-war carriers had been built by the company's American subsidiary. But in 1953, Capital sent a nine-member team, led by Carmichael, to the UK to study the world's first turboprop airliner — the Vickers Viscount.

TAHARCHIVE

ABOVE ***Capital Viscount V.745Ds in the factory at Hurn, where an additional Viscount production line was set up in 1953. Leading the line here is N7411, Fleet No 330, which made its first flight on January 20, 1956, and was delivered to Capital on March 8 the same year. Some 279 of the 444 Viscounts built were produced at Hurn.***

After visiting Vickers at Weybridge, engine manufacturer Rolls-Royce and British European Airways (BEA), Capital's management settled on the Dart-engined Viscount in a 48-seat configuration as the type best suited to its needs. The company initially leased three V.744 variants in the summer of 1955, by which time it had also exercised options to buy 57 V.745Ds with uprated engines, all of which were to be delivered over a period of two years. This was a huge commitment for an airline whose total fleet comprised 62 aircraft at the time the order was placed. As R.E.G. Davies states in *Airlines of the United States Since 1914* (Putnam, 1972): "This was a momentous event in the history of British aircraft exports, indeed of British exports as a whole". Capital made a bold commitment to pay Vickers in full for the Viscount purchase over a period of five years.

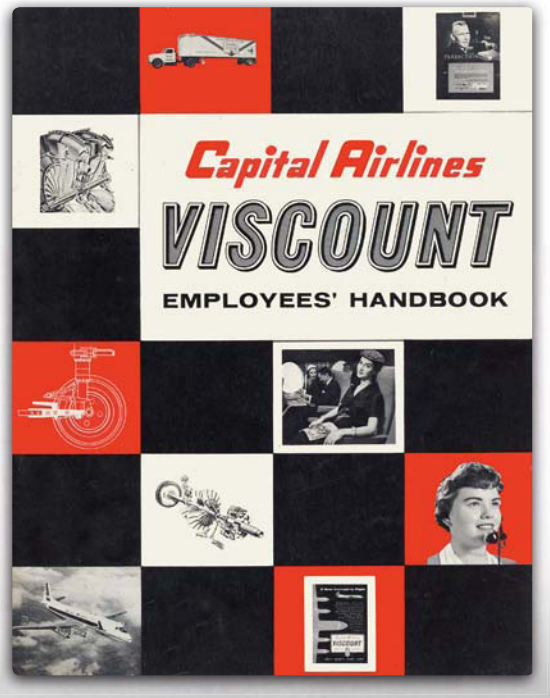
PROMOTIONAL OVERDRIVE

The airline prepared for the introduction of its new "distinguished Briton" with gusto. Every employee was educated on all features of the new aircraft, from cabin appointments to the intricacies of the state-of-the-art Dart engines. Training programmes were conducted for each department, from pilots to ticket agents.

The airline's Viscount promotional campaign was unlike anything ever undertaken before. Emphasis was placed on the technical advantages and superior passenger comfort of the Viscount, including its benefit of offering a vibration-free ride. A 45ft (14m)-long travelling trailer carried a full-scale Dart engine display and a cutaway section of a Viscount interior from town to town for public inspection. Models showing the internal workings of the Dart were placed on every ticket counter and models of the Viscount itself, in sizes ranging from 1ft (30cm) to 7ft (2m) span, were distributed to travel agents and regular customers, to be displayed in ticket offices and on airport counters. Posters, brochures, matchbooks, baggage labels, playing cards, commemorative coins, airmail stickers, postcards, calendars — anything that could advertise Capital Airlines' Viscounts was created in vast numbers. A 23min film entitled *A New Concept in Flight* was produced for public showings, television screenings and employee indoctrination.

Advertisements appeared in national magazines, on radio and television, in newspapers and trade magazines. As the service was introduced in each city, "advertising in local media steps up to an unprecedented level", according to the *Capital Airlines Viscount Employees' Handbook*. Shortly

"THE AIRLINE PREPARED FOR THE INTRODUCTION OF ITS NEW 'DISTINGUISHED BRITON' WITH GUSTO. EVERY EMPLOYEE WAS EDUCATED ON ALL FEATURES OF THE NEW AIRCRAFT, FROM CABIN APPOINTMENTS TO THE INTRICACIES OF THE DART ENGINES . . ."



ABOVE ***The bible for Capital's staff concerning all aspects of Viscount operation, the*** **Employees' Handbook** ***contained everything the staff member could ever possibly need to know about the aircraft. Page 22 (*****ABOVE RIGHT****) shows the 45ft-long trailer containing a full-scale Dart engine and a cutaway section of the Capital Viscount's "luxurious interior".*** DAVID H. STRINGER COLLECTION

The first of the initial three Viscounts to be delivered to Capital was V.744 N7402 (c/n 88), Fleet No 321, named **Capitaliner Viscount Washington,** ***which was handed over to Capital on May 17, 1955. The three V.744s were leased to Capital while its V.745Ds were still under construction. Of the three V.744s, N7402 and N7403 had returned to the UK by February 1958, N7404 having been written off in a landing accident at Chicago-Midway on February 20, 1956.*** TAH ARCHIVE

DAVID H. STRINGER COLLECTION

LEFT *Capital's 1955 brochure, also called* A New Concept in Flight*, drew attention to the Viscount's 26in (66cm)-high by 19in (48cm)-wide windows, which offered splendid views for the passengers. The brochure also challenged passengers to "balance a quarter on your table at 25,000ft . . . a true symbol of the Viscount's smooth, vibrationless flight".*

before the type entered service, the decision was made by Capital's management to reduce the Viscount's seating capacity from 48 to 44.

The first three Viscounts to arrive from the UK, registered N7402–N7404, were Dart 506-powered V.744s. The remaining 57 were V.745Ds fitted with forward integral airsteps, the first nine being equipped with Dart 506s, the remainder with Dart 510s. They were stunning in Capital's red-and-white livery featuring a stylised hawk emblazoned on the forward fuselage, blending into a red cheatline running aft. On the fin, which carried a hawk wing motif, the word VISCOUNT was printed in red letters, just in case anybody was unaware of the name of this marvellous, cutting-edge aircraft they were witnessing.

INTO SERVICE

Capital's Viscounts entered service on July 26, 1955, with two daily first-class return flights between Washington DC and Chicago, and one round-trip daily between Washington DC and Norfolk and Washington DC—Pittsburgh—Chicago. They were an instant hit. Passengers loved the type's famously big oval windows and the quiet vibration-free ride. Renowned aircraft interior designer Charles W. Butler equipped each seat with something revolutionary — a tray table which dropped down from the back of the seat in front. This feature would, of course, become standard equipment in airliners built afterwards.

The Viscount's speed was comparable to that of its competitors, but its ability to ascend and descend quickly meant that it spent more of its journey at cruise altitude, and thus wound up arriving at its destination quicker than the piston-engined aircraft of United, American or TWA.

As more Capital Viscounts came on line, the intense advertising continued. Colourful magazine ads appeared monthly. Each timetable issue featured a new Viscount-themed cover (see page 94). Capital's Viscounts were the talk of the industry and the airline captured a bigger share of the market everywhere it deployed the type. And it deployed them everywhere, except to the smallest stations.

It should be noted that Trans-Canada Air Lines (TCAL) holds the distinction of operating the first Viscounts in North America, putting the type into service three months before Capital. A few other foreign carriers (Cubana, British West Indian Airways and TACA) also brought their Viscounts to the shores of the USA between 1955 and 1957. In December 1957 BOAC introduced the Bristol Britannia turboprop on its London—New York route; but, until 1958, Capital was the only carrier operating turboprop aircraft domestically within the USA. Indeed, Carmichael and his associates were so pleased with the Viscount that Capital ordered another 15, bringing the airline's total commitment to 75.

Carmichael could be proud that night at The Mayflower in 1957. It seemed that everyone in the country knew of Capital Airlines through

Viscount V.745D N7447 (c/n 203) was delivered to Capital on October 29, 1956, acquiring Fleet No 366. The registration on the fin was relocated in larger type on the rear fuselage in 1958 in line with new FAA regulations. Artwork by JUANITA FRANZI / AERO ILLUSTRATIONS © 2018

VIA AUTHOR

ABOVE ***In early 1960 Capital unveiled a new colour scheme, replacing the elegant "hawk" theme with a more austere scheme incorporating a white fuselage top with a broadening red line aft to a white and red fin carrying a simplified oval logo with upper case Bold Gothic letters; it had been noted that the old identity was not in capitals!***

the publicity generated by its ultra-modern fleet of turboprop aircraft, and the company was the talk of the industry. Purchasing the Viscount had been a dramatic and potentially risky move, and Carmichael was able to tell his audience about another bold decision on his airline's behalf: Capital had placed an order for 14 Comet jet-liners (four Comet 4s and ten Comet 4As), which were expected to enter service in January 1959. Capital Airlines was on top of the world.

CAPITAL PUNISHMENT

All this good news coming from the podium at The Mayflower was highly encouraging for those with a stake in Capital. The airline had posted a $4m net profit in 1955. But in 1956, with lots of Viscounts deployed and with route authority from the CAB to fly non-stop between New York and Chicago, Detroit, Atlanta and Birmingham, the airline posted a net loss of $1·2m. Speaking at the Society of Automotive Engineers' National Aeronautic Meeting in the spring of 1957, Carmichael stated that the Viscount fleet by itself had made a profit; the loss was attributed to the other aircraft types in the Capital fleet.

Some individuals in Capital's management team didn't care for Carmichael's approach to leadership, and not all of them were pleased with the huge investment in Viscounts. In a boardroom coup similar to the one that placed Carmichael at the helm of Capital ten years before, the directors voted him out of the presidency. Monro was still on the board, and his friend and fellow board member George Hann brought in Maj-Gen David Baker, retired Director of Procurement & Production for the USAF's Air Materiel Command, to serve as Capital's next leader. Carmichael was named chairman of the board.

As happened with other airlines which have been reflections of their leader's personalities, when Carmichael was removed from the helm of Capital the airline's fate seems to have been sealed. As a dyed-in-the-wool "airline man" with connections throughout the industry, Carmichael had the resources available to him to navigate these stormy years. He approached his good friend, William "Pat" Patterson, President of United Air Lines, about the possibility of merging the two carriers. It was agreed that Carmichael would become president of the merged company and Patterson would be chairman of the board. Capital's employees would have benefited as the workforces of equally respected airlines would have joined together. But Capital's board of directors nixed the idea.

Capital's 1957 financial results continued the flow of red ink with a net loss just shy of $3m. Something was wrong at Capital and everyone had their own opinion of what the problem was. One of Carmichael's friends, Capital's Vice-President of Traffic & Sales, James W. Austin, the man behind Capital's successful advertising campaigns, was recruited by Northeast Airlines to take the helm of that company. Defections and changes among Capital's management team continued for the duration of the airline's existence. Carmichael himself handed in his resignation in 1958, moving on to become Vice-President, then President, of the Fairchild Aircraft Corporation. The orders for the Comets and for the 15 additional Viscounts were cancelled.

THE CRISIS DEEPENS

In January 1958 Capital was granted a three-month moratorium on making payments for the Viscounts owing to the airline's critical financial

Seen here in 1961 shortly after the merger of Capital and United, V.745D N7454 (c/n 209), originally delivered to Capital in November 1956 with Fleet No 372, taxies out in its new United Air Lines uniform. Note the legend "Viscount Mainliner" applied to the rear fuselage of United's Viscount fleet.
UNITED AIRLINES ARCHIVE

situation. The management team then signed a contract to purchase nine Convair 880 jetliners with options to acquire six more for a total bill of $60·3m. This deal was contingent upon General Dynamics, manufacturer of the 880, negotiating arrangements with Vickers for payment of the $48·5m that Capital still owed on the Viscounts. The airline then borrowed $2·5m on a short-term line of credit from Chase National Bank in order to get payments for the Viscounts up to date. The bank granted the credit on the basis of an improving financial picture after a fare increase.

Capital finally received authority to operate from some midwestern cities non-stop to Florida in 1958, but this was not going to be enough to get the airline out of trouble. The company's bottom line wasn't helped when mechanics walked out on a 38-day strike over pay issues in late 1958. On top of everything else, Capital suffered four fatal Viscount crashes between April 6, 1958 and January 18, 1960. This series of accidents included the loss of two Capital aircraft, a Constellation and a Viscount, on the same day.

The airline's net loss for 1959 was $1,757,000; 1960's loss was a staggering $10m. Capital was the world's biggest producer of turboprop revenue passenger miles in 1959, yet the airline could not translate that traffic into profit. The company maintained a rosy outward appearance for the public, however, introducing a new logo and a new livery in early 1960. Despite mounting debt, Capital also placed an order for five Lockheed L-188 Electra turboprops, none of which would ultimately see service with the airline.

Meanwhile, the other trunk carriers in the USA were operating their first jets while Capital was falling deeper and deeper into financial straits, unable to keep up payments on the Viscounts that had been the latest and greatest thing in commercial aviation just five years before.

In May 1960, with millions of dollars in payments overdue, Vickers sought to foreclose on the airline's entire Viscount fleet. Since Capital's management was unable to reverse the company's financial spiral, the only options appeared to be merger or bankruptcy. A deal was struck to merge with United. Unlike the blending of two successful carriers that Carmichael had tried to negotiate a couple of years before, now it would be the takeover of a failing company by a much healthier organisation. When United issued its first timetable of integrated schedules, effective July 1, 1961, there was no mention at all of Capital Airlines, only a statement that United was now "serving 117 cities".

A UNITED FRONT

Fingers of blame for Capital's demise were pointed in many directions. Some said that Baker did not know how to run an airline. Baker blamed decisions made by Carmichael before his arrival. Many people blamed the Viscount, saying that Capital had too many and that the aircraft had too few seats. In addition to being handicapped by a network of short- and medium-haul routes that were expensive to operate, the root causes of Capital's failure were an overly ambitious payment schedule for the Viscounts, which could have been renegotiated, and the post-Carmichael management's inability to deal with problems as they arose.

United took on 48 of Capital's Viscounts and returned 15 of them to Vickers as part settlement of the outstanding debt. The airline then bought back several of those same machines, bringing the fleet total to 41. United continued to operate the Viscounts over Capital's former routes for another seven years, proving that the distinguished Briton was, indeed, "tailor made for [Capital's] purposes", as Slim Carmichael had announced at the Mayflower on that March evening in 1957.

NEXT TIME *Continental Airlines and the Viscount — or "Jet Power Viscount II" as the airline's enthusiastic marketing department preferred to refer to it . . .*

NIKOLAY YAKUBOVICH COLLECTION

SHCHERBAKOV'S FORGOTTEN WORKHORSE

THE SHCHERBAKOV SHCHE-2 IN MILITARY & CIVIL SERVICE

In the wake of Germany's invasion of the Soviet Union in June 1942, the Russians identified a need for a dependable, rugged utility aircraft to carry vital supplies between factory and ever-shifting front line. Enter Aleksei Shcherbakov's little-known but much-used Shche-2 twin-engined transport. **NIKOLAY YAKUBOVICH** describes the type's genesis and subsequent service

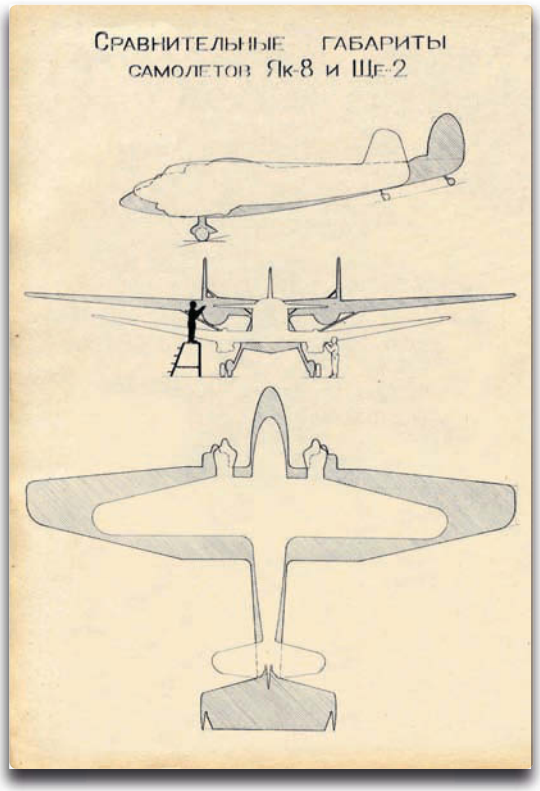
AT THE BEGINNING of the Great Patriotic War (as the Soviet Union's involvement in the Second World War is referred to in Russia) an acute need arose to deploy small cargo shipments by air to areas close to the front line. As a result, work began at the design bureaus of Aleksandr Yakovlev and Aleksei Shcherbakov on a pair of medium light twin-engined aircraft, designated Yak-6 and TS-1 respectively. The former passed state testing in the autumn of 1942 and entered series production. Operational experience, however, revealed that the Yak-6's two Shvetsov M-11F engines were woefully inadequate and that the fuselage capacity was insufficient to carry vitally important replacement aircraft powerplants and tank engines. As a result the military began to look into Shcherbakov's TS-1 proposal, which had a wider fuselage and a large cargo door.

DOING IT THE EASY WAY

Shcherbakov's design team fully understood the complexities of putting a brand new aircraft into production during wartime, and decided to use a simple design incorporating readily available sub-assemblies and parts previously developed for other series-production aircraft. Thus the engine-bearing section was borrowed from the Polikarpov Po-2 biplane trainer, powered by a 115 h.p. Shvetsov M-11D five-cylinder air-cooled radial engine. For the new design, two M-11s were installed on a high-mounted trapezoidal wing, which was braced with steel-tube struts.

The TS-1's fixed mainwheels incorporated the oleos of the Lavochkin La-5 fighter, while the tailwheel was from the Ilyushin Il-2 Shturmovik. The power from the two M-11s was insufficient to achieve high speeds, so the design team refined the external contours of the wide-cross-section fuselage as much as possible, giving it an aerodynamically clean shape. The cockpit was enclosed in a canopy, and the mainwheels were initially provided with streamlined fairings.

The aircraft was manufactured mainly from wood and fabric, with 23m³ of aviation-grade pine, 1,570m² of plywood and 350kg of steel alloy being used per aircraft, each of which took 1,000 man-hours to manufacture. The large dimensions of the cargo hold enabled the design to be used to transport large items up to 1·43m (4ft 8in) wide and 1·64m (5ft 5in) tall, including — importantly — standard barrels of fuel. The transport of cargo items up to 6·5m (21ft 4in) in length was permitted. The port side of the fuselage incorporated a cargo door, into which was integrated a passenger door.



NIKOLAY YAKUBOVICH COLLECTION

ABOVE ***A contemporary Soviet document comparing the dimensions of the Shche-2 (shaded) and the Yak-8, a slightly larger development of the Yak-6, which was the main rival to Shcherbakov's original TS-1 design (TS for* Transportnyi Samolyet *– Transport Aircraft). Some 1,000 Yak-6s were built but only one Yak-8 prototype.***

The TS-1 was capable of carrying 14 passengers on folding seats or nine casualties on standard army stretchers, as well as dropping paratroopers and cargo items. Moreover, the aircraft could easily be converted from a troop-carrying transport into a casualty evacuation (casevac) aircraft and back again. The wing incorporated slotted flaps able to deflect to 36°, which reduced the landing speed and the length of the landing roll by up to 160m (520ft).

FIRST FLIGHT

The prototype TS-1 was completed in January 1943 and in early February test pilot Vladimir Fyodorov undertook the aircraft's first flight. On August 1 the same year the TS-1 began its state testing programme at the Soviet Air Force Scientific Research Institute in both troop-carrying and casevac variants, under the super-

OPPOSITE PAGE, TOP ***Front-line transport ancient and modern — a Red Army soldier poses with his bicycle beside Shche-2 serial 131947, fitted with Shvetsov M-11D engines and fixed-pitch two-bladed wooden propellers. Ukrainian-born Shcherbakov was initially a specialist in high-altitide aircraft and pressure-cabin technology.***

The prototype TS-1 in its original configuration with undercarriage fairings. These were later removed for operational use at semi-prepared airstrips and fields. Shcherbakov received funding in September 1942 and reportedly completed the design within six weeks. Construction of the prototype had begun by the end of the year.

NIKOLAY YAKUBOVICH COLLECTION

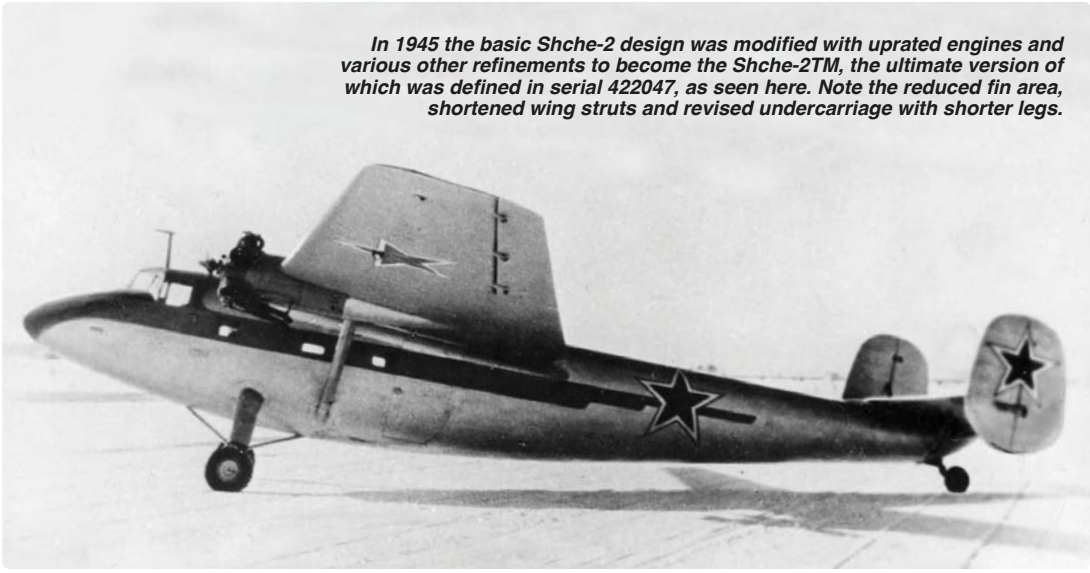
vision of test pilot Aleksandr Dolgov. On August 27 the aircraft returned to *Gosudarstvennoye Aviotsonnoye Zavod* (Aviation Manufacturing Plant — GAZ) No 482 at Khodynka, near Moscow, to address various issues that had come to light during testing. The following year, production of the aircraft was launched at GAZ No 47 in Chkalov (now Orenburg), the type being given the designation Shche-2. By the end of 1944 some 222 had been delivered to the *Voyenno-Vozdushnye Sily* (V-VS — Soviet Military Air Forces).

In May 1944 state testing of the first production Shche-2, serial 03147, was completed at the V-VS Scientific Research Institute and confirmed the data acquired previously. The floor of the cargo compartment had been strengthened and the mass balancing of the ailerons was also improved, as were the mainwheels' shock-absorbers. Other modifications included an oil-dilution system, a re-profiling of the fins and an increased wingspan.

The Shche-2 underwent continual refinement and in October 1944 a trainer variant, serial 08247, underwent testing at the Scientific Research Institute, having been developed by Shcherbakov in accordance with requirements set out by V-VS Long-Range Aviation Command. The type was well suited to training pilots and radio-operators, but testing was stopped after ten days as the relevant equipment had not been properly installed. While 08247 underwent further modifications and "snagging", Shche-2 serial 11547 arrived at the Scientific Research Institute to fulfil a similar role. It had been converted from a production aircraft at GAZ No 47 with the assistance of the 2nd Aviation Technical College in Chkalov. This aircraft was intended to train students in aerial navigation and communications, and trials proved that the aircraft could be used to train students in visual orientation, complex radio-navigation, radio-communications and aerial photography.

Further testing with 08247 revealed that not only was it possible to train navigators, but the crew as a whole. It was for this reason that an RPK-2S fixed-loop radio compass was added to the aircraft's equipment, as was an RSB-3bis radio suite with a US-1 receiver. Bombing training was achieved by day with the incorporaton of an

Shcherbakov Shche-2 serial 03147 was the first production aircraft, and was operated as part of the People's Commissariat of Aviation Industry at Chkalov. It passed its State trials at the V-VS Scientific Research Institute in the spring of 1944 and is seen here in a standard three-tone scheme with red stars on fuselage and fins. Artwork by ANDREY YURGENSON © 2018



In 1945 the basic Shche-2 design was modified with uprated engines and various other refinements to become the Shche-2TM, the ultimate version of which was defined in serial 422047, as seen here. Note the reduced fin area, shortened wing struts and revised undercarriage with shorter legs.

NIKOLAY YAKUBOVICH COLLECTION

OPB-1 bombsight, and by night with the help of an NKPB-7 night bombsight. An astrodome was fitted above the forward section of the fuselage to train navigators in astro-navigation.

The subsequent offical test report stated that "08247, as submitted for trials, is more versatile in terms of the nature of the roles it is able to fulfil than 11547. [In the former's configuration] it [will be] indispensable for front-line units looking to train crews to fly bomber aircraft". The Shche-2 was accordingly put into series production as a trainer and fitted with RPK-10 and RPK-2 fixed-loop radio compasses as well as an RSB-3bis radio set. The aircraft could accommodate up to eight students and an instructor.

FURTHER IMPROVEMENTS

In June 1945 a further modified example, serial 071547, was submitted for trials fitted with uprated 145 h.p. M-11FM engines in low-drag NACA cowlings, a pneumatic starting system and new VISh-327D-451 variable-pitch propellers of 2·4m (7ft 10½in)-diameter, in place of the original wooden fixed-pitch propellers. The balancing of the ailerons was also improved, the mechanical drive for the flaps was replaced with a pneumatic system and a larger tailwheel was fitted. The fuselage was strengthened and a short-wave RSI-4M radio set and RPKO-10 compass with a distance-tracking device were fitted.

As a result the aircraft became 200kg (440lb) heavier but its flight characteristics substantially improved, with an increase in maximum speed from 157km/h (98 m.p.h.) to 169km/h (105 m.p.h.); this could have been higher but the low quality of the airframe's external finish, an unavoidable consequence of wartime production under severely restricted conditions, took its toll. The modified variant, designated Shche-2TM, was recommended for series production, but minus the engine cowlings and with all the defects that had come to light having been eradicated.

Built at GAZ No 47 in 1945, Shche-2TM serial 422047 was the prototype of the final variant of the aircraft. Along with uprated M-11FM engines installed in revised nacelles, other modifications included a reduction of the wing area from 63·9m² (688ft²) to 54·9m² (591ft²), removal of the flaps and a reduction in length of the wing struts from 3·21m (10ft 6in) to 1·97m (6ft 5in). The struts were also hollowed to store compressed air. The area of the tailplane was reduced from 10·14m² (109ft²) to 8·12m² (87·4ft²) and that of the fin reduced from 5·48m² (59ft²) to 4·86m² (52·3ft²). Fuel capacity was reduced owing to the removal of the forward fuel tanks. The mainwheel legs were shortened, and the diameter of the mainwheels reduced. The front glass panels in the pilot's cockpit, which had previously protruded forwards, were replaced with panes of flat glass, and the cargo floor covering was lightened. All of this also had a positive effect on the aircraft's centre of gravity.

The aircraft arrived at the Scientific Research Institute in Moscow not having completed its static testing programme, which meant it could not undergo full-scale state testing, and so could not be recommended for series production. Nevertheless, a significant improvement in flight characteristics, when compared to a production example, was confirmed. The type completed trials with three fixed-pitch and one variable-pitch propeller, but the best results were achieved with two VISh-327-D210 variable-pitch propellers.

The Shche-2TM never entered series production owing to the large-scale curtailment of aircraft production that followed the end of the war, the same reason that work on a diesel-engined Shche-2, the factory testing of which had begun in July 1945, was left unfinished. By 1947 a total of 567 Shche-2s had been manufactured.

NIKOLAY YAKUBOVICH COLLECTION

LEFT ***A rare photograph of a production Shche-2 (with M-11D engines and fixed-pitch two-bladed wooden propellers) at the V-VS Scientific Research Institute airfield, with a group of pilots and engineers. Second from right is test pilot and Hero of the Soviet Union Pyotr Belyasnik.***

BELOW ***As well as being extensively used by the V-VS, the Shche-2 also saw service with the Soviet-controlled Yugoslav and Polish air arms in the immediate post-war period. Bearing unit marking "3", Shche-2 serial 18947 is seen here in the colours it wore while operating with the Polish Air Force's 13th Transport Regiment in 1947.***

During the Great Patriotic War V-VS Shche-2s were used to transport all manner of materiel, including aircraft engines, propellers, fuel and spare parts, to front-line airfields. Some of the first examples were sent to the 600th Air Transport Regiment, which became part of the 4th Special Air Division. On joining the regiment these examples began to replace the unit's war-weary Yak-6s. The commander of the 600th Regiment, which comprised 41 aircraft across four squadrons by the end of 1944, was Major Vladimir Petrov.

The first serious combat test for the type took place during June–July 1944, when ten crews from the 600th Air Transport Regiment flew their Shche-2s during the Bobruysk Offensive, led by the 1st Belorussian Front (equivalent to an Army Group). The crews fulfilled orders they had been issued by the Commander of the 6th Air Army, to transport air crews and technical personnel during the repositioning of their units, as well as supplying them with equipment, ammunition and fuel and lubrication materials.

The Shche-2 was also used on several occasions to transport high-ranking officials, as well as deliver ammunition, medical supplies and provisions to cadres of partisans behind enemy lines. The type also operated successfully as a medical evacuation aircraft to transport wounded personnel back behind Soviet lines.

In addition to its primary transport role, the Shche-2 was used to train parachutists and deliver paratroopers behind enemy lines, and undertook courier duties and delivery sorties carrying urgent operational information from the front line to Supreme Command Headquarters. Aside from its somewhat unsatisfactory power-to-weight ratio, the Shche-2 proved to be a very low-maintenance and reliable machine. Most of its shortcomings were the result of manufacturing issues, caused by a generally low level of qualification among junior workers.

The 600th Air Transport Regiment operated the Shche-2 until May 1945, when the unit re-equipped with the Lisunov Li-2, essentially a licence-built version of the ubiquitous Douglas DC-3. Amazingly, only two Shche-2s were lost in accidents, both owing to engine failure.

OUT OF UNIFORM AND ABROAD

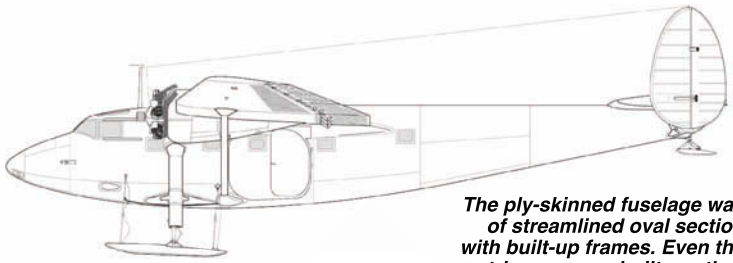
A civil variant of the Shche-2, fitted with Shvetsov M-11D engines, was put forward and underwent comprehensive testing at the Civilian

Artwork by ANDREY YURGENSON © 2018

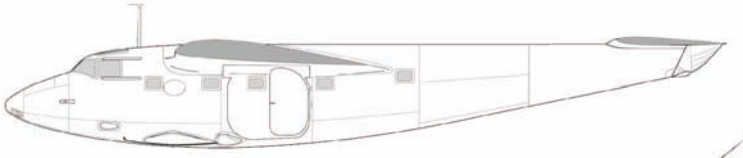
SHCHERBAKOV SHCHE-2

ARTWORK BY ANDREY YURGENSON © 2018

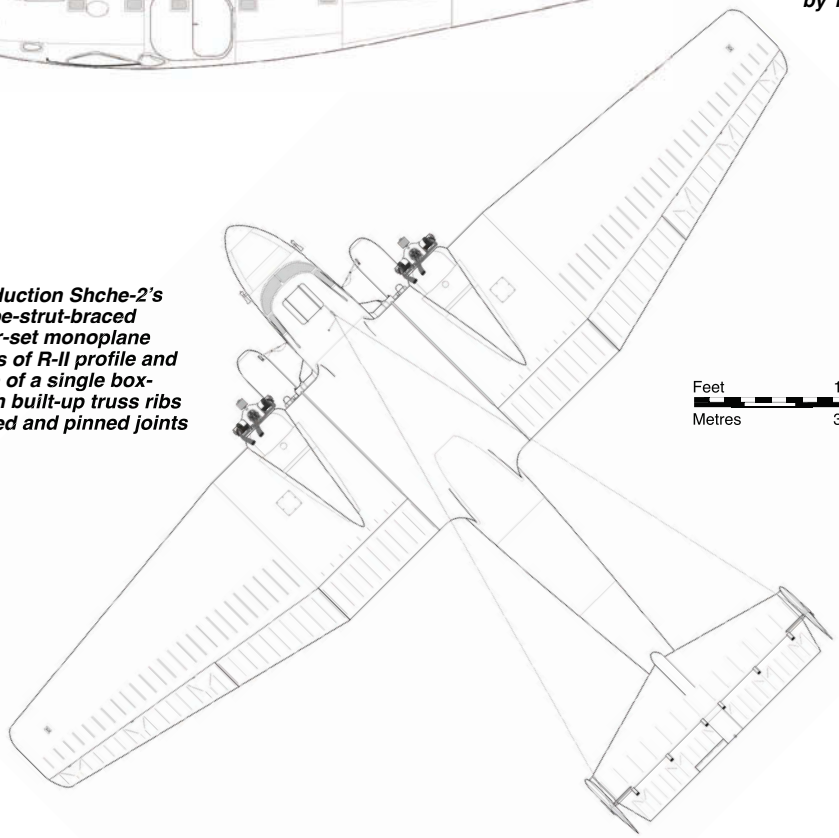
After the war the Shche-2 was deployed in a number of roles in civilian service, including being fitted with skis and used in support of winter fishing expeditions in the Archangelsk region of northern Russia, as depicted in this three-view. The view below shows the wing and tailplane aerofoil sections

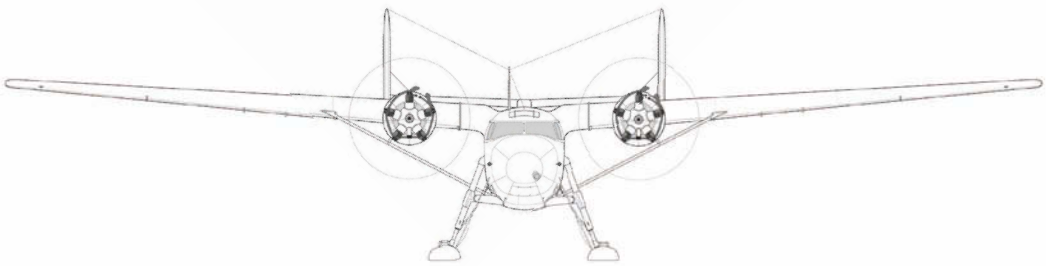


The ply-skinned fuselage was of streamlined oval section with built-up frames. Even the stringers were built-up: they were light 10mm x 30mm box sections comprising 4mm x 8mm timber booms connected by 1mm ply webs



The production Shche-2's steel-tube-strut-braced shoulder-set monoplane wing was of R-II profile and made up of a single box-spar with built-up truss ribs with glued and pinned joints





ROBERT GRETZYNGIER COLLECTION

ABOVE ***Shcherbakov Shche-2 "White 2" has its engines run up in preparation for a training sortie while serving with the Polish Air Force's Military Pilots' School at Dęblin in eastern Poland circa 1946. Reportedly, while in V-VS service, one Shche-2 was fitted with General Motors diesel engines from an American armoured vehicle and flown.***

SHCHERBAKOV SHCHE-2 DATA COMPILED BY NIKOLAY YAKUBOVICH

	Shche-2 serial 03147 as at 17.05.1944	Shche-2 serial 071547 as at 14.07.1945	Shche-2TM serial 122047
Powerplant	2 x 115 h.p. Shvetsov M-11D	2 x 145 h.p. Shvetsov M-11FM	2 x 145 h.p. Shvetsov M-11FM
Dimensions			
Span	20·48m (67ft 2in)	20·48m (67ft 2in)	18·13m (59ft 6in)
Length	14·27m (46ft 10in)	14·27m (46ft 10in)	14·27m (46ft 10in)
Height, tail down	3·82m (12ft 6in)	3·82m (12ft 6in)	3·82m (12ft 6in)
Wing area	63·88m² (687·6ft²)	63·88m² (687·6ft²)	54·9m² (591ft²)
Crew	1–2	1–2	2
Weights			
Empty	2,340kg (5,159lb)	2,422kg (5,384lb)	2,000kg (4,409lb)
normal take-off	3,400kg (7,496lb)	3,500kg (7,716lb)	3,100kg (6,834lb)
overload take-off	3,600kg (7,937lb)	3,700kg (8,157lb)	3,400 (7,496lb)
Fuel			
normal	370kg (816lb)	—	355kg (783lb)
maximum	—	630kg (1,389lb)	—
Normal commercial load	500kg (1,100lb)	520kg (1,146lb)	—
Payload			
normal	1,130kg (2,491lb)	—	1,100kg (2,425lb)
maximum	1,330kg (2,932lb)	—	1,400kg (3,066lb)
Performance			
Speed			
max, sea level	160km/h (99 m.p.h.)	169km/h (105 m.p.h.)	171km/h (106 m.p.h.)
cruising	134km/h (83 m.p.h.)	—	—
Take-off distance*	300m (980ft)	315m (1,030ft)	265m (870ft)
Landing distance	110m (360ft)	—	165m (540ft)†
Rate of climb	1·85m/sec (364ft/min)	—	1·65m/sec (324ft/min)
Time to climb to 500m (1,600ft)	5min	7min	5min 30sec
Service ceiling	2,400m (7,900ft)	2,000m (6,600ft)	—
Range			
normal	850km (530 miles)	708km (440 miles)	805km (500 miles)
ferry flight	2,160km (1,340 miles)	—	—

* From a rolled snow-covered runway
† On runway with artificial surface

A pair of Shche-2s await their next sortie while operating on fishing expeditions from bases in the Archangelsk region after the war. The type was neither fast nor luxurious, but proved to be dependable and capable in such demanding conditions.

GENNADY PETROV COLLECTION

BELOW ***Shcherbakov Shche-2 registration CCCP-X867 belonged to the People's Commissariat of the Fishing Industry and is seen here in the colours it wore while operating with the Northern Directorate of the Civil Air Fleet in support of hunting and fishing expeditions from Ruchyi Air Base in the Archangelsk region, circa 1948.***

Air Fleet Scientific Research Institute, with the aim of establishing the aircraft's suitability for transporting up to nine passengers on folding seats, or cargo, over a distance of up to 900km (560 miles). The recommendations that were drawn up for Aeroflot's pilots by the Civilian Air Fleet Scientific Research Institute enabled short-route commercial operators to use the Shche-2 in the post-war years widely, up until the entry into service of the Antonov An-2 biplane, which first flew in late August 1947.

The Shche-2 was also used extensively for casevac and transport duties in remote regions, and undertook fisheries reconnaissance. A notable example of the latter was the Archangelsk Directorate of the Civilian Air Fleet's use of the type to deliver fishermen directly on to the ice during the winter fishing season.

A number of Shche-2s entered service with Yugoslavia's newly formed *Jugoslovensko Ratno Vazduhoplovstvo* (JRV — Yugoslav Air Force) in 1945, and played a key role in the formation of the *Lotnictwo Wojsko Polskiego* (the Soviet-controlled People's Polish Air Force). In the spring of 1944 Polish paratroopers used Shche-2s for training purposes at one of the flying schools in Chkalov, and in 1945 Shche-2s began to enter service with the Polish Air Force. Polish pilots had first encountered the type in 1944 during their basic radio-navigation training at the 2nd Military Navigation School in Chkalov.

The Polish Air Force's 13th Separate Transport Air Regiment received its first Shche-2 in February 1945 and operated it up until the end of May 1945. In March the same year two Shche-2s entered service with the Polish 15th Separate Reserve Air Regiment, and another two joined the Military Pilot's School at Dęblin. These aircraft contained a gift to Poland from Soviet Command in the shape of training instruments and navigation, bombing and aerial gunnery equipment. In the second half of 1945 all the Polish Shche-2s were transferred to the Military Pilots' School. The last example was taken out of service in October 1947.

Artwork by ANDREY YURGENSON © 2018

PERFECT 10

(Not) naming the VC10 in RAF service

Continuing his occasional series on the frequently knotty issue of deciding on a name for aircraft types entering RAF service, **CHRIS GIBSON** uses contemporary documents to reveal the dozen names thrown into the ring by various ministries, members of the RAF brass and manufacturer as potential monikers for the Vickers VC10 in military uniform

BAE SYSTEMS

ABOVE ***The first of the RAF's VC10 C Mk 1s to be delivered (along with XR808), XR806 undergoes pre-delivery preparatory work beside the test hangars at Wisley in 1966.***

MAIN PICTURE ***Having made its first flight on March 25, 1966, the second of the RAF's VC10s, XR807, alights on the Farnborough runway at that year's SBAC show.***

BAE SYSTEMS

IN SEPTEMBER 1961 the UK Air Ministry placed an order for five Vickers VC10s for the RAF, with another six ordered the following August. These were supplemented by an additional three from a cancelled BOAC order in July 1964. As always with new types, there was the question of a suitable name for the aircraft in RAF service. "Vickers Type 1106 VC10 C Mk 1" was a bit of a mouthful.

Air Marshal Sir Geoffrey Tuttle had retired as Deputy Chief of the Air Staff (DCAS) in 1959, going on to become General Manager at Vickers-Armstrongs (Aviation) Ltd. It was in this capacity on October 17, 1962, that he wrote to the incumbent DCAS, Air Marshal Sir Ronald Lees, with a question — what was the RAF going to call its VC10s? Tuttle informed Lees that BOAC had shown no intention of naming its VC10s and that Vickers would prefer that all VC10s were so called in the interest of its sales campaign. Tuttle asked that the RAF also call its aircraft VC10s, but appreciated that "there may be overriding considerations which would lead to the Air Ministry naming it and of course, it is entirely their prerogative". Tuttle signed off with one final request that if a name was being decided, "we would like to be consulted, because we have some views on suitable names".

Eliminating the unsuitable

There was no precedent for not naming an RAF aircraft, which was the job of the Air Council; apparently the Ministry of Aviation (MoA) was "very touchy" about not being consulted before any decision was made by the Air Council, the governing body of the RAF. The department tasked with finding a name for the VC10 was S.6 at the Air Ministry, led by E.F.C. Stanford, who had to ask the MoA, RAF Transport Command and Vickers for their suggestions.

RAF AIR HISTORICAL BRANCH x 2

ABOVE LEFT ***Air Marshal Sir Ronald Lees, Australian by birth, was appointed Deputy Chief of the Air Staff (DCAS) in July 1960. He went on to become C-in-C RAF Germany in June 1963.*** **ABOVE RIGHT** ***Air Marshal Sir Geoffrey Tuttle served as DCAS during 1956–59, and on his retirement from the RAF joined Vickers as General Manager.***

There was, of course, a procedure for naming RAF aircraft: the Assistant Chief of the Air Staff (Operational Requirements) — ACAS (OR) — would recommend names to the DCAS, who would then put them to the Air Council after seeking suggestions from the MoA, manufacturer, Air Member for the Supply & Organisation department (AMSO) and the Command concerned.

By January 24, 1963, Stanford had a few suggestions and was attempting to eliminate the "obviously unsuitable". He observed that "Sir Geoffrey Tuttle's suggestion simply to call it the VC10 has not found favour". The reasons given were that it would break with tradition, would set an "unfortunate precedent" and that the subsequent designations, such as "VC10 C Mk 1" would be unwieldy. As for names, Transport Command and AMSO favoured "Victoria" but this was considered too easily confused with the Handley Page Victor 1A, especially in signals traffic and supply or technical documents. The Director of Ops (Air Transport) suggested "Vancouver" or "Windsor".

Air Vice-Marshal Christopher Hartley, ACAS (OR), saw no real problem with Victoria as the Victor 1A would soon become the Victor K.1 tanker. Hartley considered "Venture" to be "somewhat more enterprising than 'Voyager'", the latter suggested by Air Marshal Lees. The ACAS (OR) signed off with a rather tongue-in-cheek remark, stating, "but for a recent unfortunate case, I would have proposed Vassal". Hartley was referring to the case of John Vassall, convicted of spying for the Soviet Union in October 1962.

Lees dropped Tuttle a line on January 25, 1963, to inform him that "Air Ministry opinion is fairly solidly against not giving a name to the VC10" and to warn him that the MoA would soon be in touch about its suggestions. The debate rumbled on into February, with the AMSO adamant that Victoria should not be used even if the possibility of confusion was remote. The third week of February saw the DCAS submit his suggestions: "Vimy" for its historical connections, "Weybridge" as suggested by Vickers and Lees's favourite, Voyager.

Little happened on the VC10 name front for six months, the Air Staff being busy with the "Gap Filler" flap during which a fairly desperate search for a Skybolt air-launched nuclear missile substitute was under way. The Royal Navy's Polaris-carrying *Resolution*-class submarines were ordered in May 1963, ending any prospect of the RAF carrying the UK's nuclear deterrent. In July 1963 the newly promoted Air Marshal Sir Christopher Hartley, now DCAS, instructed the head of S.6 at the Air Ministry to "prepare a paper recommending that the Air Council should agree the name 'Vimy' for the VC10".

Vimy it is . . .

On August 12, 1963, Hartley's paper was discussed by the Air Council. As noted above, Victoria was "ruled out because of confusion" while Voyager was "not favoured at all". It was thought that Vickers' first preference, Weybridge, should "be discarded because of the extent to which the VC10 will be built at Belfast". This reflected the intention to have Short Bros build most of the forward and rear fuselages of the

BAE SYSTEMS

ABOVE ***As the RAF's first VC10, XR806 became the subject of numerous photographic sorties around the time of its entry into service. In November 1968 '806 was named*** **George Thompson VC,** ***in honour of a Lancaster wireless operator who had rescued two crewmates from their burning turrets during a 1945 raid, later dying of his injuries.***

RAF's original VC10s in Northern Ireland.

Hartley advised, however, that Vimy would commemorate a famous British battle and was "also the name of a Vickers aircraft flying at the end of the First World War". He also pointed out that the original Vimy "made a number of notable flights, including the first non-stop crossing of the Atlantic", that Vimy was Vickers' second choice after Weybridge and that the MoA would not object. Hartley signed off by inviting the Air Council to endorse Vimy as the RAF name for the VC10.

On August 29 the conclusions of the Air Council meeting were made available. The name for the VC10 had been discussed, with particular relevance to the guidelines for naming transport aircraft after "countries, towns or districts of the Commonwealth". Hartley's preference for Victoria was raised, as was Vimy, while the argument against Victoria was also brought up again. Four more names were suggested; "Upavon"; "Valentia"; "Venturer" and "Viceroy", but the Council agreed that none was as suitable as Victoria and invited the DCAS to reassess the possibilities for confusion.

Hartley duly did so and reported on September 5 that "there must be a risk of confusion . . . between the two names" (Victoria and Victor) and that this could "prejudice operational efficiency, particularly as the VC10 and the Victor tanker could both be working at high intensity over the same routes during times of crisis". Hartley also advised that such confusion with Britannia had led to the Short

With a BAC One-Eleven in the background, XR806 comes in for a landing at Wisley during its test programme in late 1965. The Type 1106 was essentially a "hybrid" VC10 developed specifically for the RAF, the fuselage being the same length as the Standard VC10 but incorporating many of the modifications introduced on the Super VC10.

BAE SYSTEMS

BAE SYSTEMS

ABOVE ***The first two VC10 C Mk 1s were officially delivered to the RAF at Wisley on July 7, 1966, when Sir Charles Portal, Chairman of the British Aircraft Corporation (seen here at the microphone), handed over XR806 and XR808 to Chief of the Air Staff Air Chief Marshal Charles Elworthy. Note the state-of-the-art flagpole (dustbin and scaff!).***

Britannic transport being renamed Belfast. Less than two weeks later the Vice-Chief of the Air Staff (VCAS), Air Chief Marshal Sir Wallace Kyle, advised that "although the risk is not very great, it is a real one and therefore I cannot support the use of the name Victoria". Kyle's preference was for Vimy, then Viceroy.

. . . or Valentia . . . or Voyager . . .

On September 19 AMSO reported his thoughts on the matter. He agreed with Kyle on Victoria and was "not attracted to Vimy, which will not, I think, have great significance for the younger generation". As for Viceroy, this was not very appropriate in the modern anti-imperialist world and timid passengers might find Venturer rather disturbing!". Kyle favoured Valentia, a later development of the original Victoria aircraft; but, if this failed to find favour, Kyle would "settle for Voyager, which is both descriptive and appropriate for a transport aircraft". A week later Hartley was supporting AMSO's negative view on Victoria, but proposing that Valentia be put to the Air Council.

By September 27 Stanford at S.6 had given his thoughts on the matter. He agreed with the rejection of Victoria but considered Vimy, Viceroy, Venturer, Valentia and Voyager to be a matter of personal taste, although he agreed "with AMSO's objections on the first three".

Expanding on the argument against Vimy, Stanford wrote that "Vimy, to the younger generation, would probably sound more like a soap-powder or detergent than an aircraft". As for Valentia, Stanford thought that "the general public would think this rather too Spanish or Irish for an RAF aircraft". Returning to Tuttle's original request that the RAF adopt the same name as BOAC, Stanford suggested that "we give the name VC10 some consideration", as it had the merits of brevity and simplicity.

Would not giving the VC10 a name be a break with tradition? Certainly not, as during the First World War there was the Royal Aircraft Factory S.E.5 and Airco D.H.9 and "other aircraft existed with these titles alone". Stanford certainly gave the impression of not being at all bothered about naming the VC10: "If names are really desired, we shall have so few of these VC10s that it would be quite possible to allot them individual names". Stanford continued the theme, suggesting that they could be named

"Vimy, to the younger generation, probably sounds more like a soap-powder or detergent than an aircraft…"

BAE SYSTEMS

ABOVE ***With everything hanging down, XR806 lands at Wisley in late 1965. The VC10 entered RAF service with Transport Command's No 10 Sqn at RAF Fairford, moving shortly thereafter to Brize Norton, where it remained until disbanding in 2005 (re-forming in 2011). Transport Command became Air Support Command in 1967.***

after "Chiefs of the Air Staff or Battle of Britain pilots — or give them some other names with RAF connections".

Keep it simple

At the Air Council meeting on October 3, 1963, the objections to the various names were noted and the participants agreed that the aircraft "should continue to be known as the VC10 after it had entered RAF service". This would be in accordance with BOAC practice and the council invited the DCAS to "take action accordingly". On October 16 Hartley wrote to Tuttle at Vickers to inform him that the Air Staff had been unable to "find a name which has unanimous support and so, at long last, we have decided to continue to call it VC10".

The type entered service with No 10 Sqn from July 1966, and in November 1968 each of the 14 aircraft were named after "Air VCs" — aircrew holders of the Victoria Cross, each carrying its name until retirement, after which the name was transferred to another VC10. On September 25, 2013, VC10 K.3 ZA147 departed RAF Brize Norton for a flight to Bruntingthorpe to complete the last ever flight of a VC10.

The RAF's VC10 list of heroes

THE RAF'S ORIGINAL 14 VC10s were all named after Victoria Cross holders, as detailed below. These were later applied to other RAF VC10s, including the tankers, as the originals left service.

XR806 *George Thompson VC* (trsfr'd to ZA148)
XR807 *Donald Garland VC* and *Thomas Gray VC* (trsfr'd to ZA150)
XR808 *Kenneth Campbell VC*
XR809 *Hugh Malcolm VC* (trsfr'd to XR808 in 2011)
XR810 *David Lord VC* (trsfr'd to ZD241)
XV101 *Lanoe Hawker VC* (trsfr'd to ZA150)
XV102 *Guy Gibson VC* (trsfr'd to ZA148)
XV103 *Edward Mannock VC* (trsfr'd to ZA149)
XV104 *James McCudden VC* (to ZD241)
XV105 *Albert Ball VC* (trsfr'd to ZA147)
XV106 *Thomas Mottershead VC* (trsfr'd to XR808)
XV107 *James Nicolson VC* (trsfr'd to ZA149)
XV108 *William Rhodes-Moorhouse VC* (trsfr'd to ZA148)
XV109 *Arthur Scarf VC* (trsfr'd to ZA147)

ACKNOWLEDGMENTS *The author would like to thank John McCrickard, Albert Kitchenside and Harro de Jong (www.vc10.net) for their help with this article*

ARMCHAIR AVIATION

We take a look at what's available for the aviation history enthusiast in the world of books and other literature, from hot-off-the-press publications to reissued classics

Gerhard Fieseler: The Man Behind the Storch

By Nigel Holden; Helion & Company, 26 Willow Road, Solihull, West Midlands B91 1UE; 7in x 9½in (175mm x 246mm); hardback; 304 pages; illustrated; £25. ISBN 978-1-911512-74-5

SUCH WAS THE range, success and market dominance within Nazi Germany of aircraft designers and manufacturers Messerschmitt, Heinkel, Tank, Junkers and Dornier, that in the post-war years the likes of Gerhard Fieseler have tended, unfairly, to be relegated to a "second division" in the eyes of historians. Happily, the publication of this biography, the first of its subject in the English language, has gone a long way towards rectifying that.

However, this reviewer found Nigel Holden's book to be something of a curate's egg. Early on in his text, the author declares a somewhat denunciatory view of his subject and on occasion I wondered whom he saw as his audience. Given that the subject of his study will, in all probability, attract an already knowledgeable readership, he could have saved himself the effort of some detours; for example, the account of von Richthofen's death in 1918 and a detailed historical backdrop on the Weimar Republic.

Understandably, the author draws heavily on Fieseler's autobiography, which has not yet been published in English, but almost exclusively this is a biography based on secondary sources. In fairness, I do not know what, if any, primary sources exist on Fieseler or his companies, but detailed Allied intelligence summaries of the Kassel, Bettenhausen and Waldau production plants are available in UK archives.

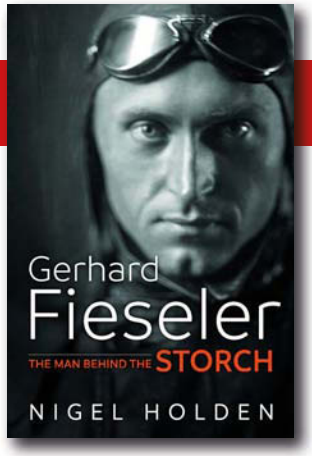
Fieseler grew up a hot-headed young man and experienced a tough, hardworking childhood. He saw action as an aviator in the First World War in Macedonia, where he flew Albatros types and Fokker D VIIs. The author presents a vivid account of Fieseler's war, but there is uncertainty as to the number of aerial victories he is credited with. In this regard, few of the excellent standard secondary sources are used. For example, given that Fieseler was an "ace", a quick check of *Above the Lines* by Franks, Bailey and Guest provides a detailed summary of Fieseler's operational career during 1916–18, together with his various decorations and details of his 19 victories claimed over the Balkans.

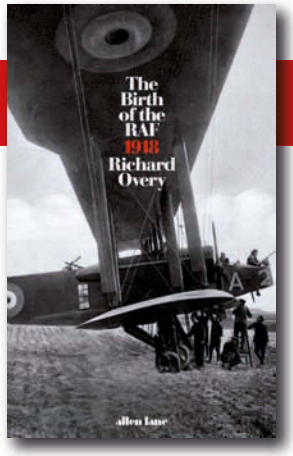
This seems to chart a course for the book; while the author has undoubtedly undertaken a diligent and close study of Fieseler's life, the source base appears limited. For example, there is inference that the meeting and besting of Fieseler by fellow First World War ace Ernst Udet at Germany's first national aerobatics championship in 1928 has been left unrecorded, yet it gets a mention in Armand van Ishoven's widely available 1977 biography of Udet.

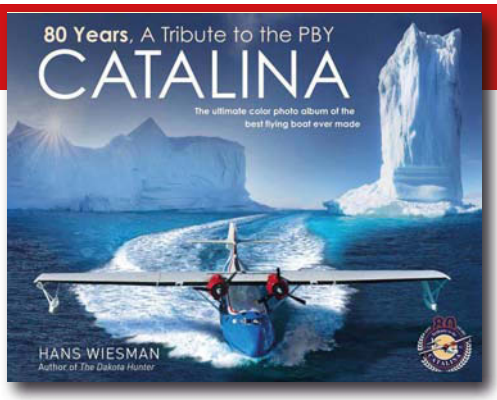
There is good coverage of Fieseler's troubled experiences with the pioneering partnership of Antonius Raab and Kurt Katzenstein, as well as his life as an aerobatics pilot during the late 1920s/early 1930s, something from which he made "substantial earnings". Yet as the text moves forward in time, there are references to Heinkel aircraft and German inter-war aviation credited to the untrustworthy Wikipedia.

Holden paints a vivid picture of Fieseler as something of a determined, innovative and highly intelligent but precocious extrovert. His colleagues found him to be "obstinate and dogmatic" as well as occasionally quirky. On one occasion after a period of strain and while preparing for an aerobatics show in Paris, he disappeared into his hotel room, drew the curtains and slept for two days.

By the outbreak of the Second World War Fieseler was running a burgeoning business, building aircraft for Messerschmitt, Arado and Heinkel and employing 4,200 personnel, including 100 designers. Holden refers to a marvellous quote from Fieseler after his ill-fated Fi 98 "Stuka" lost out to the Ju 87 for a German Air Ministry dive-bomber specification: "It







wasn't a weapon of attack. It was a single-seater, from which it was possible to drop a bomb".

The book gives good coverage to Fieseler's successful life as an aircraft designer and, inevitably, the emergence and success of the Fi 156 Storch and the V1 flying-bomb, as well as his attempts, post-war, to whitewash his involvement in the Nazi war effort, although he had a restless and combative retirement. Holden describes him as a stubborn old man.

There are a few banana skins. The author refers to issues of "Flight Global" magazine from the late 1920s when what he means is *Flight* rather than the name of the present-day online resource, and the text could have benefited from a more thorough proofreading, as some niggling typos remain throughout. In summary, this is a valiant, informative and much-needed work, but it seems to lack important archival input.

ROBERT FORSYTH

The Birth of the RAF, 1918

By Richard Overy; Allen Lane, an imprint of Penguin Random House (www.penguin.co.uk); 6in x 9in (142mm x 224mm); hardback; 160 pages; illustrated; £14.99. ISBN 978-0-241274-21-7

IT IS UNLIKELY to have escaped any *TAH* reader's attention that this year marks the 100th anniversary of the formation of the Royal Air Force in April 1918, resulting in an avalanche of books describing the storied history of the service and its exploits. Surprisingly few, however, have tackled the nuts and bolts of the formation itself and the reasons behind the need for an independent air arm in the first place.

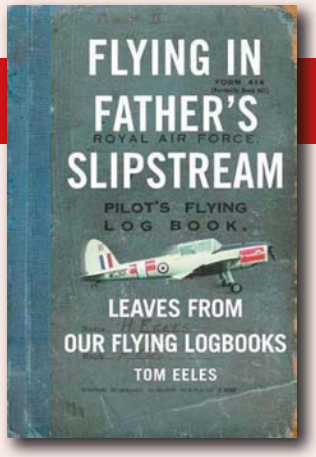
Renowned historian Richard Overy, Professor of History at the University of Exeter and author of definitive works such as *The Bombing War* and *The Battle of Britain: Myth and Reality*, has produced this no-nonsense "just the facts" account of the political and military circumstances in 1917 that prompted the British Prime Minister, David Lloyd George, to ask South African Lt-Gen Jan Smuts to compile a report on Britain's air defences and how best to improve them. Smuts turned to the Director General of Military Aeronautics, Sir David Henderson, who wrote much of the subsequent report and who has never really received the credit he is due for creating the impetus behind the establishment of the world's first independent air force.

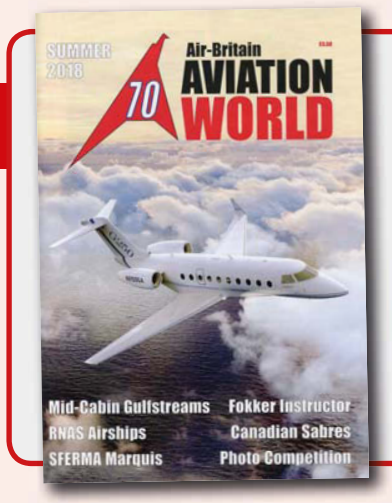
Henderson's role is covered here but, again, he is relegated to some degree to just one of a cast of characters (some of which were clearly far better at self-promotion) present at the time, rather than the chief architect of what would become the *raison d'être* of the proposed service, i.e. a brand-new autonomous organisation free of the wrangling between the Army and Royal Navy for control of the nation's air power resources.

A comparatively slim volume (*The Bombing War* was a thumping 880 pages), this does a fine job of providing the essential story of the RAF's establishment, with an introductory chapter putting the role of aviation in Britain into historical context (although the author falls into the common trap of asserting that A.V. Roe first flew in 1908 — it was actually the summer of 1909). The remaining three chapters detail the commissioning of the Smuts Report, the formation of the RAF and, perhaps most interesting of all, the battle to maintain its existence after the end of the First World War.

A plate section on glossy paper of rather indifferently reproduced (and captioned) monochrome photographs accompanies the text, although none adds a great deal to the story. This is an attractively-presented and admirably concise guide to the often-painful birth pangs of the junior service, and an excellent place to start for those who want to sharpen their knowledge of the founding philosophy of the RAF.

NICK STROUD





Catalina: 80 Years — A Tribute to the PBY

By Hans Wiesman; Avion Ventures, available from The Aviation Bookshop, 31–33 Vale Road, Royal Tunbridge Wells, Kent TN1 1BS (www.aviation-bookshop.com); 12in x 10¼in (302mm x 264mm); hardback; 288 pages; illustrated; £44.99. ISBN 978-9-082810-00-4

AS HE DID for the Douglas DC-3 with his earlier book *The Dakota Hunter — In Search of the Legendary DC-3 on the Last Frontiers*, Hans Wiesman clearly shows his lifelong affection for the Consolidated PBY Catalina in this new large-format book. Living in the Borneo jungle in the early 1950s, Wiesman encountered both types at a young age and never lost his passion for these two classic piston-engined aircraft.

Containing more than 400 high-quality photographs, the new book's subtitle — *The Ultimate Color* [sic] *Photo Album of the Best Flying Boat Ever Made* — is something of an understatement. In addition to its numerous colour photographs, this hardback coffee-table-format book also contains an excellent selection of historic monochrome photographs, many never published before.

After a distinguished military career in various roles in numerous theatres of operation during the Second World War, the "Cat" was later extensively used as a passenger- and freight-carrying aircraft, opening up many remote areas around the world. In Canada and elsewhere the Catalina also served as a waterbomber for many years.

Wiesman has an entertaining way of sharing his extensive knowledge of the amphibian flying-boat, and, after covering the type's wartime exploits with copious photographs, he continues on into the post-war years, and that period's equally interesting stories of the aircraft. Unfortunately, at this point the book bogs down, with the next 85 pages covering Wiesman's two ten-leg "Catalina Odysseys". The Atlantic Tour with Zimbabwean-registered Canso Z-CAT in 1993 and the Trans-American Tour in 1994 with VR-BPS may have been highlights of the author's life, but devoting this much attention to them is surely overkill. At least 14 full-page photographs could easily have been left out without spoiling the story, and the resulting space used for more information on other aspects of the type's career, for example the Catalina waterbombers. The aircraft's use in places like Greenland, Chile, Venezuela, Iceland and Spain also deserves more than a single page per country.

The book concludes with some detail about PBY survivors, but a summary or table of these would be useful for Catalina enthusiasts and not difficult to provide. With input and proofreading by distinguished Catalina historian David Legg, Wiesman's personal tribute to the PBY deserves to be a success, despite some shortcomings.

DIRK SEPTER

The Boeing KC-135 Stratotanker — More Than a Tanker

By Robert S. Hopkins III; Crécy Publishing Ltd, 1a Ringway Trading Estate, Shadowmoss Rd, Manchester M22 5LH; 8½in x 11½in (216mm x 290mm); hardback; 384 pages, illustrated; £27.95. ISBN 978-1-910809-01-3

BY 1954 IT WAS obvious that the USAF's Strategic Air Command (SAC) would need a jet-powered aerial tanker if it was to meet its global Cold War commitments and support its force of intercontinental jet bombers, including its state-of-the-art Boeing B-52s and Convair B-58s.

In July that year Boeing flew its 367-80 proof-of-concept jet transport, designed and built at the company's own cost — and at no little risk. By late 1954 SAC had made its decision on who would build the new tanker, the only logical choice being . . . Lockheed, with its VC10-like L-193, a drawing-board project from a company

Air-Britain & AVIATION WORLD

Aviation World *edited by Rod Simpson; 8½in x 11¾in (216mm x 292mm); 144 pages, illustrated. Published quarterly by Air-Britain, included in annual membership (Jan–Dec) Category B: £30 (UK); £34 (Europe); £37 (RoW). Website www.air-britain.com. Telephone + 44 (0)1394 450767*

CELEBRATING ITS 70th anniversary this year, Air-Britain is without question the UK's "grand-daddy" organisation for aviation enthusiasts and historians. While many *TAH* readers will already be members, those who are not will find a treasure trove of information, photographs and expertise available within its considerable resources. A recent restructuring has considerably simplified the membership into just three categories: **A** — members receive *Air-Britain News*, a monthly digest of registration and serial information; **B** — *Aviation World*, a 144-page quarterly journal covering general and historic aviation; and **C** — both *Air-Britain News* and *Aviation World*. The latter has recently undergone a significant "facelift" and incorporates the organisation's former *Aeromilitaria* (military) and *Archive* (civil) imprints. The Summer 2018 issue packs in more than 20 articles on various subjects, a fine example being Mike Draper's fascinating feature on the loss of an Air-India Lockheed Constellation in flight in 1955 owing to sabotage. The organisation is also world-renowned for the quality of its books, all of which are industry-standard reference works, and which members can obtain at preferential rates. The recently upgraded website is also excellent, with a Members' Area chock-full of useful info. We say membership is a must for all serious aviation enthusiasts, historians, authors and researchers! **NS**

with zero experience in designing and building large jet-powered aircraft. Boeing, however, was given an order for an interim tanker version of its innovative "Dash 80" to fill the gap until the Lockheed design could enter service. The latter was never built and the KC-135, as the Boeing tanker was designated, was put into production and used by nations all over the world for the next 60 years. And it looks like it will remain in service for at least another decade — or two.

The rest is pretty much history, and what a long and steadfast history it is, told expertly in this definitive update of former KC-135 *Cobra Ball* "crewdog" (and *TAH* contributor) Robert S. Hopkins III's Aerofax monograph on the type, published by Midland back in 1997. This is essentially a whole new book, however, extensively revised, updated and incorporating new material, including excellent infographics by fellow *TAH* author Chris Gibson (although this reviewer would like to have seen these used bigger — some of the text is on the very borders of legibility) and offers detours down some fascinating backwaters via sidebars and panels.

Divided into 11 chapters, the book gets the Crécy treatment, with excellent paper that will resist the ravages of ageing, flawless proof-reading and superb photographic reproduction. Each chapter deals with one of the numerous roles performed to perfection by the ubiquitous '135; and more than 500 photographs, maps and illustrations help tell the full story of the 820 built, individual details of each of which are included, as is foreign use and the part the type played in space exploration. Five comprehensive appendices cover everything else, including production batch information, attrition, retirements and SAC tail markings.

If you have any other books on this subject in your library, throw them away — they're obsolete and of no further use. Unlike the remarkable KC-135 Stratotanker.

NICK STROUD

Flying in Father's Slipstream

By Tom Eeles; Arena Books, 6 Southgate Green, Bury St Edmunds IP33 2BL; 6in x 9in (155mm x 235mm); softback; 130 pages, illustrated; £12.99. ISBN 978-1-911593-22-5)

SUBTITLED *LEAVES from our Flying Logbooks,* this engaging paperback spans 80 of the RAF's 100 years through the flying experiences of father-and-son pilots Air Cdre Harry Eeles CB CBE and his son Gp Capt Tom Eeles BA FRAeS — the latter has also written the article on flying the Blackburn Buccaneer, *Brute Force & Innovation*, on pages 66–75 of this issue.

RAF pilots' logbooks provide an essential and valuable record of any airman's flying career, but the usually terse entries often conceal much bigger stories. Tom has teased out some of these, and fleshed them out through research and his own recollections.

Hopping back and forth in time — all the while drawing parallels between the two careers — the action takes in first solo flights in Avro 504N and DHC Chipmunk, followed by Bristol Bulldog, EE Canberra bombing practice in Singapore, Fairey IIIF in Sudan, Buccaneer in Aden, instructing on Hawker Hart and Folland Gnat, delivering a Westland Whirlwind fighter to 263 Sqn in 1940, Hunter, Jetstream, BAe Hawk, Balliol and several more. Annexes include performance comparisons and service records.

The book's foreword is by Air Marshal Sir Ian Macfadyen, who joined the RAF at the same time as Tom, and whose father was Harry's first flying instructor in 1929 — "neatly completing", as the notes on the back cover say, "the link between the past and the present". And as if that were not enough to demonstrate the remarkable interconnectedness of aviation history, by sheer coincidence (yes, really) a letter from the very same Sir Ian opens the *Air Correspondence* pages of this very issue of *TAH!*

MICK OAKEY

BOOKS IN BRIEF

A quick round-up of what else is currently available for the aviation history enthusiast

WARPAINT SERIES No 115: ARMSTRONG WHITWORTH ALBEMARLE
Tony Buttler
Guideline Publications; no ISBN recorded; £13

A HANDY MONOGRAPH, the latest in a long-established series, this 32-page softback is written by a well-respected author and is illustrated with plentiful black-and-white photographs, plus good scale drawings and colour artwork by Mark Rolfe. Just because an aircraft type is somewhat unlovely to look at, unloved by its crews owing to its fairly rubbish performance and handling, and had an undistinguished career, it doesn't mean it does not deserve a proper write-up; and it certainly gets that here. At least it was halfway decent as a glider-tug, if nothing else. **MO**

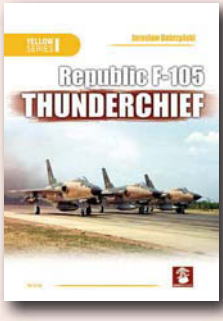
TWO UP
Ron and Jim Smith
UP Publications; ISBN 978-1-908135-39-1; £29.99

WITH A COMBINED total of nearly 80 years in the aerospace industry between them, twin brothers Jim and Ron Smith have joined forces to produce this self-published cornucopia of anecdotes from their peripatetic careers and travels in aviation, accompanied by hundreds — possibly thousands — of the photographs the pair have taken along the way. Sturdily bound with a square spine into a 300+-page compact 5¾in x 8¾in (146mm x 222mm) format, this enjoyable collection of reminiscences traces the brothers' aviation-related adventures, all of which are permeated with the conviction that flying should first and foremost be fun. Both are clearly seasoned story-tellers, and their tales are highly entertaining, from first glider flights to Mach 2 in Concorde. **NS**

LUFTWAFFE EAGLE
Erich Sommer
Grub Street; ISBN 978-1-910690-54-3; £20

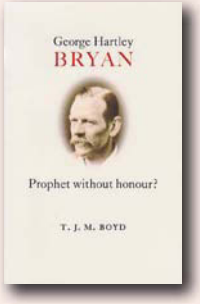
SUBTITLED *A WW2 German Airman's Story,* this 226-page hardback is an autobiographical memoir of the author's flying career, first as a navigator (including high-altitude Junkers Ju 86 flights over Britain) and then as a pilot (including flying the Arado Ar 234 jet). Sommer died in Australia in 2005, but had sent his recollections to UK-based Luftwaffe historian J. Richard Smith, who rightly believed they deserved a wider audience; this book is the result. **MO**

REPUBLIC F-105 THUNDERCHIEF
Jaroslaw Dobrzryński
Stratus (MMP Books); ISBN 978-8-365281-79-1; £20



THE BRAWNY yet still oddly attractive "Thud" gets the "Yellow Series" treatment from MMP, resulting in this excellent "one-stop shop" on the Thunderchief, including its origins, development, operational career in various roles and variants and service colours. The hallmark of this series is its attention to detail for modellers, and this is well up to the usual standard, with copious high-quality colour artworks by Marcelo Ribeiro, probably the most detailed technical description of the type currently available and superb 1/72nd-scale drawings by Dariusz Karnas on a separate sheet for ease of use. If you own one book on the F-105, make it this one. **NS**

GEORGE HARTLEY BRYAN: PROPHET WITHOUT HONOUR?
T.J.M. Boyd
Orphean Press; ISBN 978-1-908198-18-1; no price quoted



G.H. BRYAN'S name will be unfamiliar even to most of *TAH's* well-informed readership. He was Professor of Mathematics at the University of Wales, Bangor, and wrote the seminal 1911 book *Stability in Aviation.* While being "no easy read, beset by equations and rarely enlightened by physical insights", in the words of the author (himself a successor to Bryan's professorial chair), it remains important today. This slim 48-page biography publishes a major lecture given by the author in 2011, the centenary of Bryan's book — which led directly to E.T. Busk's successful stability experiments at Farnborough in the run-up to World War One. **MO**

X-PLANES No 6: BELL X-2
Peter E. Davies
Osprey Publishing; ISBN 978-1-472819-58-1; £12.99

WE RATHER LIKE Osprey's *X-Planes* series here at *TAH,* and the sixth in the series, written by eminent Cold War specialist Peter E. Davies, maintains the high standard with the story of the ill-starred, but technologically invaluable, Bell X-2. Designed and built to explore swept-wing aerodynamics, the X-2 made only 20 flights, with both examples being lost in dramatic crashes. As with the others in the series, the text is authoritative, the repro is excellent and the artwork (by Adam Tooby in this case) is top-notch. **NS**

Lost & Found

***PHILIP JARRETT** explores the lesser-known corners of aviation history, discovering unknown images and rediscovering long-lost details of aircraft, people and events. This time he spotlights a rare photograph of an inter-war RAF torpedo-recovery ship*

OVER THE YEARS the RAF has employed an assortment of marine craft in a variety of roles. One of the first, and relatively little-known, was *RAFA Adastral*, which has also been identified as RAF Tender No 1 and Steam Trawler No 1. Built by Ritchie, Graham & Milne during 1918–19 and originally named *HMS William Gillet*, it was a Royal Navy converted trawler in the *Strath* Class. It had an overall length of 123ft 8¾in (38m), a beam of 22ft (6·7m) and was powered by a single 430 i.h.p. triple-expansion engine that gave it a maximum speed of 10kt.

HMS William Gillet served with the Royal Navy until it was sold to the Air Ministry on March 9, 1921, and renamed *Adastral*. Assigned as a weapon-recovery vessel and operated by a 14-man civilian crew, it was to be used to recover torpedoes dropped by RAF aircraft in deep water offshore, where it was considered inappropriate to use a pinnace, but also served in transporting heavy stores and equipment and in providing a stable platform on which to teach navigation to the First Class Coxswains' course at Calshot.

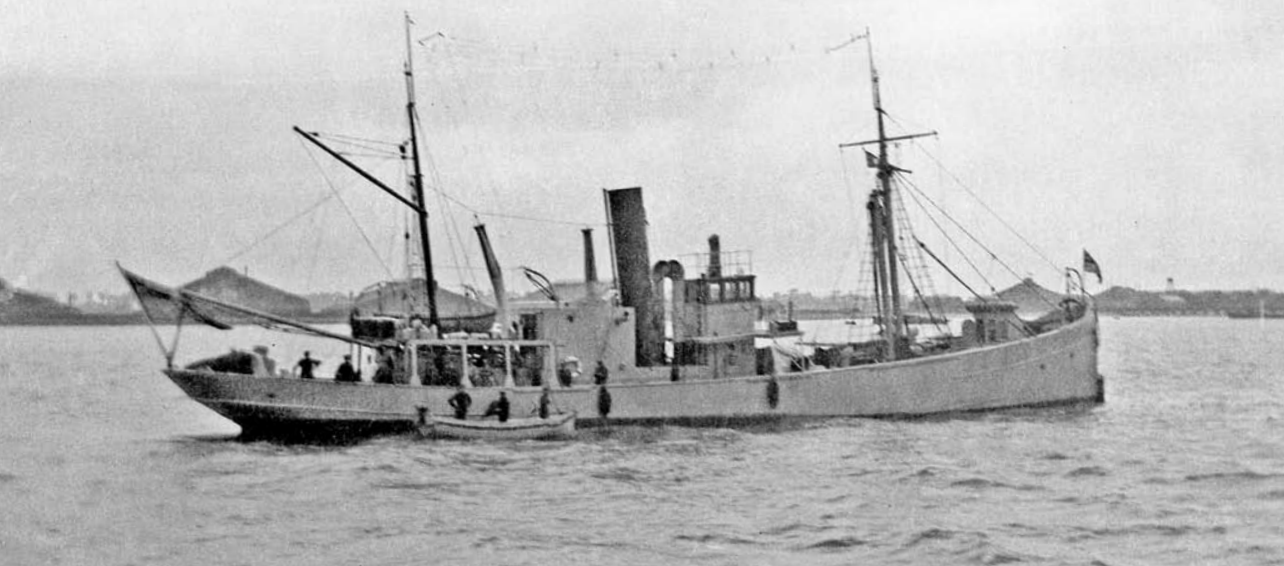
Originally held on charge at Calshot, *Adastral* also operated out of Gosport on the same duties. On October 22, 1942, it was transferred to Abbotsinch and worked from Ayr with Coastal Command. *Adastral* also served at Turnberry and in 1944 underwent repairs at McAlisters in Dumbarton, after which it was allocated to Alness on December 14, 1945. *Adastral* was then transferred to the Admiralty at Rosyth for laying up for disposal, which came on July 5, 1946.

Those Fokker movie stars . . .

The *Lost & Found* appeal in *TAH23* for information regarding the diamond-covered Fokker D VIIs elicited a response from Yves Duwelz in Belgium. He states that three unarmed ex-Belgian Air Force D VII trainers, civil-registered in 1931 as OO-AMH, 'AMI and 'AMY, were used in France in 1934 to represent German aircraft for the filming of the motion picture *L'équipage*, starring Jean Murat, Jean-Pierre Aumont, Charles Vanel and Daniel Mendaille and based on a novel by Joseph Kessel set in the First World War. My pictures were taken at this time. The D VIIs were flown (uncredited) by three Belgian military pilots; Hongena, Bolinne and Nagant. Military pilots from the centre at Reims doubled for the French actors, and the fictional "Breguet Br-XIVs" were represented by French Air Force Potez 25s.

The crashed D VII is OO-AMI, which was destroyed at Châlons-sur-Marne, near Reims, on December 29, 1934, during the filming.

BELOW ***Printed from a negative acquired by the author some years ago, this photograph of* RAFA Adastral *is captioned as being taken off Sheerness in Kent, on July 25, 1923. The RAF's Marine Craft Section was established within days of the parent organisation in April 1918, the newly-named* Adastral *becoming part of the MCS in 1921.***



SWEDEN'S GHOST ROCKETS

FLYGVAPNET JUNKERS B 3 ELINT OPERATIONS, 1946

In the summer of 1946 Sweden experienced a proliferation of mysterious encounters in which unexplained projectiles hurtled to earth at astonishing speed. Dubbed "ghost rockets" by the Swedish press, were they experimental Soviet weapons fired from former German bases in the Baltic? UFOs? Natural phenomena? **LENNART ANDERSSON** probes an enduring Cold War mystery

SHORTLY BEFORE noon on July 19, 1946, a beautiful sunny summer's day, a 16-year old girl and her mother were washing clothes on the shore of Lake Kölmjärv, 130 miles (210km) west of Överkalix in northern Sweden. Suddenly a very loud, terrifying sound rang out and the mother cried to the girl to run to the house and close the windows. While running for her life, the girl looked back to get a glimpse of something that looked like a torpedo streak down from the sky and hit the water, creating a 50ft (15m) plume. The girl and her mother were terrified, neither of them ever having heard anything like it. Later, when they dared to go near the lake again, they saw mud and clay thrown up on to its banks, with seaweed and limp water lilies floating on the surface.

CLOSE ENCOUNTERS?

The above was just one of many such encounters experienced at points all over Sweden during the summer of 1946. The Lake Kölmjärv incident led to a military investigation, which found that although it was obvious that something had hit the lake, searches with a metal-detector and Geiger counter revealed nothing. Newspapers started to describe these perplexing phenomena as "ghost rockets". During May to October 1946 large numbers of these unidentified flying objects were observed, with 450 reports of sightings in August making it the peak month. Some of the sightings were eminently credible and several were witnessed by expert military personnel, including engineers and pilots.

On July 6, 1946, Sweden's *Försvarets radioanstalt* (FRA — National Defence Radio Establishment) was instructed to try and intercept any control signals being sent out to guide the flying objects, which were immediately suspected of being connected with ongoing Soviet rocket trials. It was well known that the Soviet Union had taken over large parts of Germany's wartime rocket technology programme and its scientists in 1945, and it was feared that new weapons systems capable of reaching Swedish territory were being developed. It was thought that the German rocket test centre at Peenemünde on the Baltic Sea island of Usedom had been reactivated by the Soviets, and there were rumours of rocket experiments on the Estonian islands of Hiiumaa (Dagö to the Swedish) and Saaremaa (Ösel) at the entrance to the Gulf of Riga. A special "flying-bomb"' investigation committee was formed with representatives from the Defence Staff, Air Staff, Air Board, Navy Board, FRA and *Försvarets forskningsanstalt* (FOA — Swedish National Defence Research Institute).

Since the end of the Second World War, elements of Sweden's war plans had concentrated on a possible conflict with the Soviet Union, the so-called "War Case II", and peacetime photo-reconnaissance was directed against ships and harbours along the eastern shores of the Baltic Sea. Established in June 1942, the FRA reported directly to the Swedish government and comprised three departments — administration, analysis and signals traffic. It was, and still is, shrouded in extreme secrecy.

In December 1945 the Commander of

Is it a bird? Is it a 'plane? Is it a V2-type ballistic rocket being tested by the Soviet Union from former German sites in the Baltic? This is the only known photograph to be taken of one of the numerous "ghost rockets" observed over Swedish territory during the summer of 1946.

VIA AUTHOR

LEFT ***Germany's V2 campaign began operationally in early September 1944, with more than 3,000 ultimately being fired on Allied targets, the last in March 1945. In the wake of Sweden's "ghost rocket scare" the following year, it was initially thought that the Soviets had reactivated the captured German rocket test centre at Peenemünde — but had they?***

Flygvapnet (Royal Swedish Air Force) asked if the FOA and FRA would be able to conduct electronic intelligence (ELINT) operations against radar stations and missile-control radio stations, while also developing some form of electronic countermeasures (ECM). Foreign radio communications were also to be intercepted.

The use of a Flygvapnet aircraft for "special duties" was accordingly requested, and on March 14, 1946, a Junkers Ju 86K bomber, Swedish designation B 3, complete with crew and technical personnel, was put at the FOA's disposal. It was to be detached from F 11 Wing at Nyköping, where the pre-war-vintage B 3s were still used in the long-range reconnaissance role.

The B 3 had entered Flygvapnet service in 1936 as its first twin-engined bomber, and a total of 40 were delivered from Germany. Licensed production was started by Saab, but was cut short prematurely after just 16 examples had been built. The type was used for bombing and reconnaissance during the war and saw service with F 17 Wing at Kallinge as a minelayer and torpedo-bomber as late as 1945. After the war the type was relegated to transport and other second-line duties.

ENTER BLONDIE

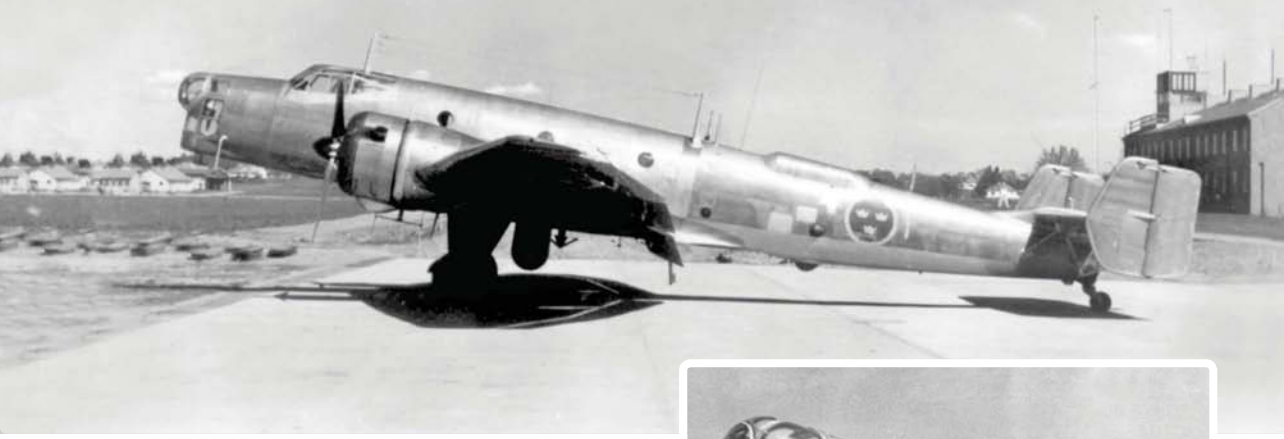
One B 3A, serial 150, was put at the disposal of the FOA and FRA from April 1, 1946. Given the name *Blondie*, after Chic Young's American cartoon character, the aircraft was often referred to as such rather than by its serial. Sergeant Stig Lindberg was detailed to fly the aircraft and he served as its pilot on all ELINT missions flown during 1946. Captain Karl-Erik Nittve, a trained pilot and observer, was in charge of the FOA's flying operations and participated personally on many of the flights. Engineer Sture Risberg was employed to take care of all technical issues. Initially, *Svenska Aktiebolaget Trådlös Telegrafi* (SATT) radar detectors ERD No 1 and ERD No 2 were borrowed from the Swedish Navy and tested, and equipment inherited from a top-secret wartime British signals intelligence (SIGINT) station at Ottenby on the Swedish island of Öland was also used.

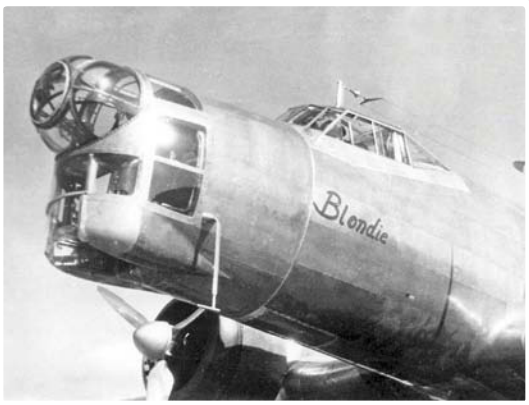
Back in late August 1944 RAF personnel, under the command of Flt Lt W.H. Allen, had arrived in Sweden in civilian clothing, along with boxes containing state-of-the-art electronic intelligence-gathering equipment. They set up a station in a little cottage near Ottenby, and the resulting

During 1936–58 some 56 Junkers Ju 86Ks saw service with* Flygvapnet*, which designated the type B 3 (B for* Bombflygplan *— bomber aircraft), 16 of which were licence-produced by Saab. One example, serial 150, seen here, was used by Sweden's FOA and FRA agencies to investigate the 1946 spate of "ghost rocket" sightings.

SVENSK FLYGHISTORISK FÖRENING

"RADAR STATIONS HAD BEEN MADE OPERATIONAL AND A NUMBER OF OBSERVATIONS SEEMED TO CONFIRM EYEWITNESSES' REPORTS OF ROCKETS. BY AUGUST 1946 SOME INTRIGUING SIGNALS HAD ALSO BEEN DETECTED ABOARD THE B 3 . . ."





VIA AUTHOR x 2

TOP & ABOVE ***The aircraft used for SIGINT/ELINT missions in 1946 was B 3A (Ju 86K-4) serial 150, named* Blondie*, powered by a pair of 820 h.p. Nohab My III (licence-built Bristol Pegasus III) radial engines. The cylindrical excrescence on the underside of the fuselage just aft of the mainwheels in the top image is the radome for its crucial AN/APS-15 navigation radar.***

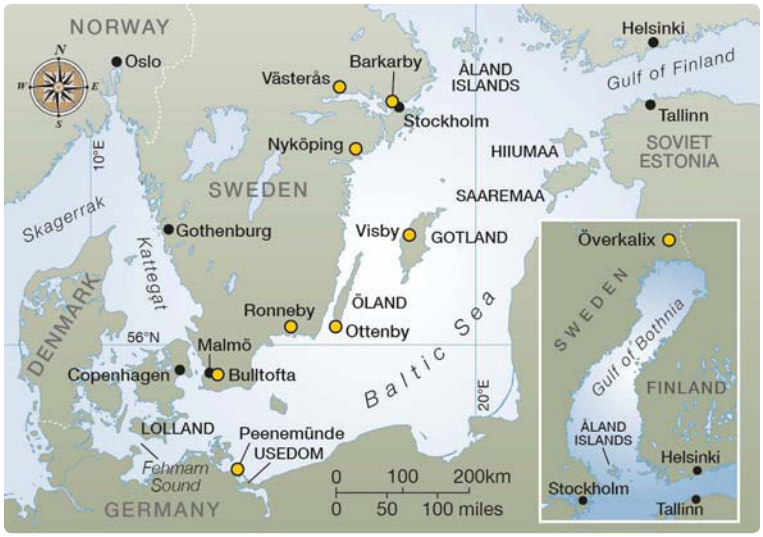
SIGINT was reported back to the UK via the British Legation in Stockholm. In one of the team's final reports it was concluded that much of the detected signals traffic comprised guiding signals for rocket tests, although it was known that the V2 rockets launched operationally had not been radio-guided. One possibility was that the *Wasserfall* anti-aircraft rocket tested at Peenemünde was radio-guided. When the British station was evacuated in April 1945, its equipment was sold to the Swedish authorities.

Blondie's first operational flight was made on June 13, 1946, and lasted about three hours. The aircraft departed from F 11 Wing at Nyköping and flew on a course, via Visby on the island of Gotland, over the Baltic Sea. On June 20 a single flight was made from Bulltofta Airport at Malmö in southern Sweden, but most of the missions would depart from Visby, which was best suited for operations within the Baltic area. Normally the aircraft took off from Nyköping, flew to F 8 Wing at Barkarby to pick up the Stockholm-based FRA and FOA personnel and their equipment, before continuing to Visby, or sometimes F 17 Wing at Ronneby in the south-east of the country. On completion of the operation the aircraft would return to Nyköping via Barkarby.

During the "ghost rocket" committee's first operational meeting on July 15, it was decided to conduct airborne ELINT operations targeting the islands of Hiiumaa and Saaremaa, and orders were issued to that effect. The codename *Frida* was assigned for this operation, but others, including *Sara,* were also used during 1946.

Meanwhile, radar stations had been made operational and a number of observations appeared to confirm eyewitnesses' reports of rockets. By August 5 some intriguing signals had also been detected aboard the B 3. They were recorded on a wire-recorder installed in the aircraft and could be analysed thoroughly after the flight. One of the signal sources seemed to be located at Peenemünde but signals from the Hiiumaa area were detected as well.

Numerous missions were undertaken by *Blondie* until the last on December 11, 1946, the majority from Visby and Ronneby, most being of 2–4hr duration, normally during daylight hours. The Soviet Union's four-nautical-mile (7·4km) territorial-waters limit served as a geographical restriction for the operations, which were directed within the whole area from the Åland



LEFT ***It was initially thought that the mysterious objects may have been coming from the former German research base at Peenemünde, more than 160 miles (250km) from the southern tip of Sweden. Map by MAGGIE NELSON.***

BELOW Blondie ***was originally on strength with F 11 Wing at Nyköping, but was later transferred to F 1 Wing at Västerås before moving again to F 8 Wing at Barkarby, near Stockholm. The aircraft wore minimal markings, bearing only its name on the forward fuselage beneath the cockpit and a standard Flygvapnet roundel either side of the rear fuselage. It was later given the fin code number "50", when based at Bromma.***

Islands in the north to the Fehmarn Sound between Germany and Lolland in Denmark in the south-west. This area included the Gulf of Finland, the Baltic, Poland and eastern Germany. When secret information about a prospective Soviet V2 rocket test on November 6 was received, the number of sorties was increased and two B 3s were used. The second aircraft was B 3D serial 125 of F 17.

PRIMITIVE CONDITIONS

Working conditions inside the B 3 for the three or four operators were rather primitive. The technicians sat on a simple wooden bench along one side of the narrow fuselage, with their equipment fixed, initially with leather straps only, on the opposite side. No direction-finding (DF) aerial was fitted; when a bearing was to be taken the whole aircraft had to be turned.

A pulse-analyser displayed the detected radio waves on an oscilloscope for analysis. The operators were expected to recognise different radar types by listening through their earphones to the humming tones and whines produced by the radar receivers. Each radar station had its own signature hum, and when this knowledge was later combined with information obtained from radio and wireless telegraphy communication intercepts, it was possible to identify, for example, individual vessels of the Soviet Navy.

Notes were normally written by hand and sometimes, especially if radio communication was detected, a wire-recorder was used. Logs were maintained and the operator was expected to be able to analyse most signals contemporaneously. Notes were made of carrier frequency, pulse frequency, modulation rate and pulse length. High-frequency radio signals, typical for radar transmissions, were detected on some 100 occasions. However, knowledge about radar was still comparatively basic in Sweden at the time and it was later found that many of the observations made in 1946 may have originated from local medical equipment and other non-military transmission sources.

American ELINT equipment was obtained after a Swedish purchasing commission visited the USA in 1946, and both the FOA and FRA made several purchases from American surplus sources. The most common radar receiver set, the AN/APR-4, had been developed by the Radio Research Laboratory at Harvard University as the RRL Type D100, and it had been modified and produced by the Galvin Manufacturing Company for the US Navy

SVENSK FLYGHISTORISK FÖRENING

STURE RISBERG VIA AUTHOR

"ALTHOUGH THE SIGHTINGS HAD BEEN ATTRIBUTED TO 'NATURAL PHENOMENA', THE UFOs COULD NOT BE FULLY EXPLAINED . . ."

LEFT ***A poor-quality but extremely rare photograph of* Blondie's *crew in 1946, with the B 3A in the background. From left to right: Stig Lindberg, pilot; Ulf Mide, observer; Sven-Uno Palmqvist (radio operator); unknown, and SIGINT/ELINT specialist Sture Risberg.***

as the AN/APR-1 and by the Crosley Radio Corporation for the US Army Air Forces as the AN/APR-4. Later versions such as the AN/APR-5 were also acquired, as were the AN/ARR-2, AN/ARR-5 and AN/ARR-7 radio receivers. Owing to the similarity of the American designations to the Swedish word *apa*, plural *apor*, the receivers were known as "apes" by their Swedish operators.

NATURAL CAUSES?

When the ghost rocket committee finally completed its work on December 12, 1946, it recommended the acquisition of new and better radar stations, increased ELINT operations, and that contact with Western intelligence services be made. After analysis of the collected material, a report was sent to the American and British military attachés in Sweden. The committee concluded that the ELINT-gathering and other reconnaissance activities had produced little in the way of usable results, and that, although the majority of the sightings had by this time been attributed to "natural phenomena", the unidentified flying objects could not be fully explained. Nothing had been found where witnesses had seen the mysterious objects hit the ground or water, but the majority of the sightings could still be explained as meteorites.

A number of British intelligence reports entitled *Investigation of Missile Activity over Scandinavia* were distributed to a large number of British and American defence organisations and came to the same conclusions. The psychological factor was stressed, and a comparison was made to numerous reports from 1939–40 about rays that stopped engines and other mysterious ideas.

Today it is known that the German rocket establishment at Peenemünde had already been relocated to Nordhausen in central Germany before the end of the war. Ramjet-powered V1-type flying-bombs, designated "10Kh", were designed and built in the Soviet Union in 1945, the testing of which continued into the 1950s; but according to available information these were never tested in the Baltic area.

In the autumn of 1946 a Soviet commission was set up to undertake practical tests with the V2, and a programme that included the launching of six rockets from Peenemünde was initiated. Preparations were well under way when Stalin suddenly decided to cancel the tests. The Americans had captured most of the technical documentation for the German rocket programme and the Soviet Union had to re-engineer the V2 before the production of parts and components for its own rocket programme could begin. The following year all materiel and personnel, including more than 300 German technicians, were transferred to Russia.

The first Soviet V2 rocket launch was finally made on October 18, 1947, but all testing took place at Kapustin Yar, north-west of Astrakhan by the Caspian Sea, more than 1,500 miles (2,400km) from the Baltic. The first tests with the Soviet-designed R-1, which was a development of the V2, were made in the autumn of 1948.

One might think that some findings may have been stamped "Top Secret" at the time and subsequently buried in the archives, but there is nothing that suggests that this is the case; certainly no such material exists in the Swedish archives. All UFO material was classified at the time but is freely available today, although the subject is still clearly a sensitive one.

Although the efforts made by the B 3 crews were inconclusive, their operations in 1946 represent the birth of Flygvapnet's airborne ELINT capability over the Baltic. *Blondie* was a pioneer in her role and was joined by American B-17s and B-29s in 1947, and by British Lancasters and Mosquitoes from 1948.

OFF THE BEATEN TRACK

PHOTOGRAPHS BY THE AUTHOR

Ever turned a corner to find something unexpected? The Aviation Historian's *intrepid aeronautical explorer* ***PETER DAVISON*** *investigates the stories behind the oddities that turn up in the most unusual places . . .*

THE UNMISTAKABLE bulbous profile of the Bristol 170 Freighter recalls, for many, the cross-Channel car-ferry flights now the domain of large ships and the Channel tunnel. Surprisingly, production of this nose-loading "truck" reached 214 in a number of variants, built at Bristol during 1945–58. Of these, 11 have been preserved, six of which served in the Royal New Zealand Air Force's fleet of 12. One of these, serial NZ5912, nearly found a home at Duxford in the UK in November 1987, although within a year it had moved to Canada before returning to the UK in 1994, only to be damaged beyond repair after a non-fatal take-off accident at Enstone, Oxfordshire, on July 18, 1996, not long after participating in a Heathrow Airport anniversary flypast.

The example seen here, Mk 31 Freighter c/n 13059, serial NZ5906 (later registered ZK-EPC), was delivered to the RNZAF in 1952 and retired from military service on August 17, 1978 having survived damage from groundfire in Indonesia in October 1965. It also served with Dwen Airmotive, National Air Freighters and Hercules Airlines, all in New Zealand, until cancellation in 1991. Retired to Ardmore on North Island, it found a new purpose at Woodlyn Park, near the Waitomo caves tourist destination ten miles (15km) south-west of Ardmore.

TOP & ABOVE ***No mod cons — Bristol Freighter c/n 13059, formerly NZ5906 with the RNZAF, is now used as a two-room hotel at the Waitomo caves tourist destination near Ardmore. The aircraft is just about visible on Google Earth at S38.25437, E175.11871.***

Recently, hopes of a Freighter making its home in the UK have been realised with another RNZAF machine, NZ5911, returning in January 2018 to Bristol, where it will become part of the Aerospace Bristol museum.

Coming up in future issues:

Pig's Ear from a Silk Purse *Professor Keith Hayward FRAeS continues his analysis of Britain's post-war aviation industry with the troubled procurement of the F-4 Phantom*

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